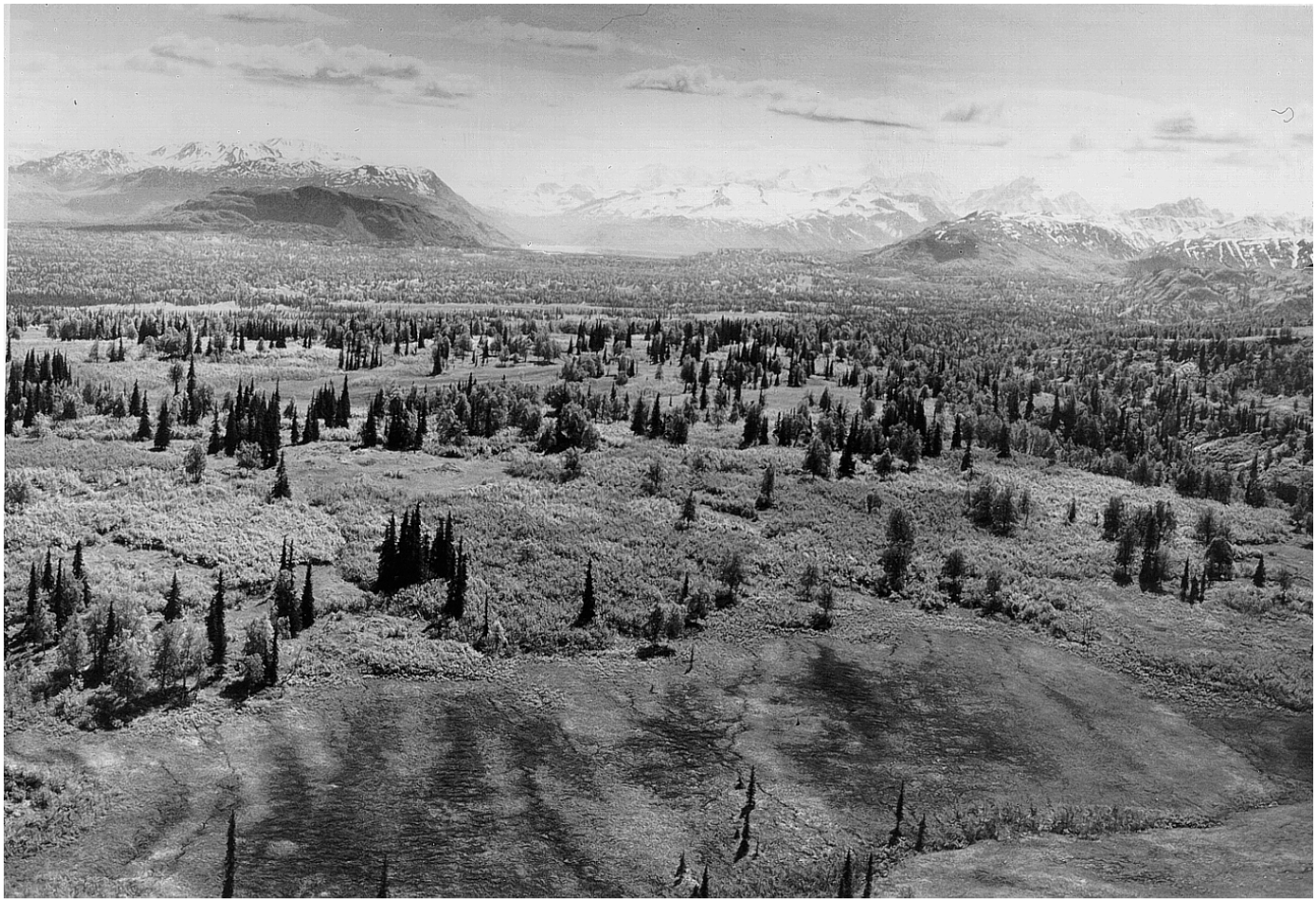
United States Department of Agriculture
Natural Resources Conservation Service

In cooperation with
University of Alaska Agricultural and
Forestry Experiment Station, and
State of Alaska Department of Natural
Resources

Soil Survey of Yentna Area, Alaska



This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture, State agencies, including the Agricultural and Forestry Experiment Station, and local agencies. The Natural Resources Conservation Service (formerly the Soil Conservation Service) has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1982. Soil names and descriptions were approved in 1986. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1982. This survey was made cooperatively by the Natural Resources Conservation Service, the University of Alaska Agricultural and Forestry Experiment Station, and State of Alaska Department of Natural Resources. It is part of the technical assistance furnished to the Upper Susitna Soil and Water Conservation District and the Alaska Soil and Water Conservation District.

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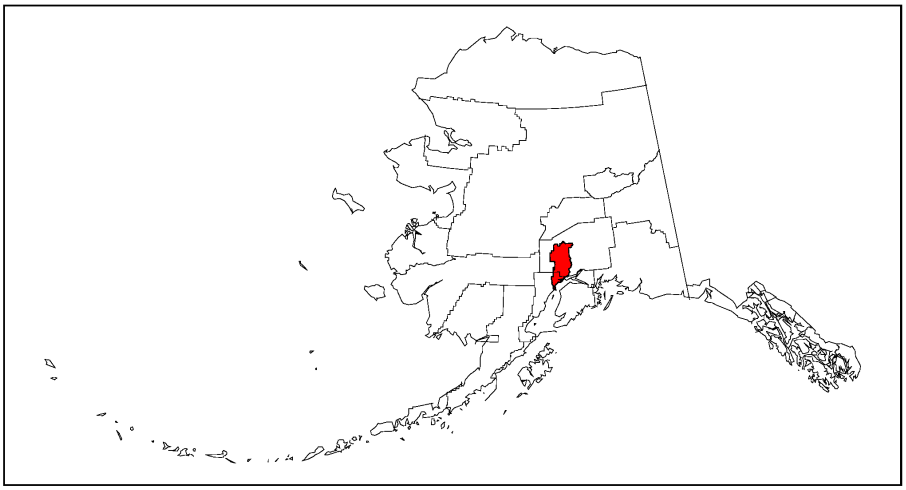
Cover: Salamatof and Starichkof soils in muskegs and Slikok and Spenard soils on moraines are common across the complex glacial landscape of the Yentna Area.



Location of the Yentna Area in Alaska

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Foreword

This soil survey contains information that can be used in land-planning programs in the Yentna Area, Alaska. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, and others can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, and waste disposal, can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too steep to be used as a foundation for buildings or roads. Wet soils are poorly suited to use as sanitary landfills. A high water table makes a soil poorly suited to shallow excavations.

Many soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Natural Resources Conservation Service or the Alaska Cooperative Extension.

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Soil Survey of
Yentna Area, Alaska

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United States Department of Agriculture, Natural Resources Conservation Service,
in cooperation with
the University of Alaska Agricultural and Forestry Experiment Station and State of Alaska Department of Natural Resources.

General Nature of the Survey Area

YENTNA AREA is in the south-central part of Alaska. It extends west from the Susitna River to the Alaska and Aleutian Mountain ranges and south from the Alaska Mountain range to Cook Inlet. It has a total area of 3,213,652 acres, or 5021 square miles.

The survey area consists mainly of glacial till and outwash plains and remnant glacial features, and includes mountainous areas, alluvial plains and tidal plains. The entire area has been influenced by glacial action. Mountainous areas are on the west and north boundaries and in the central part of the survey area. Alluvial plains are adjacent to the major rivers, and tidal plains are found on the south boundary of the survey area along Cook Inlet. Elevation ranges from sea level by Cook Inlet to 4684 feet (1427 m) on Dickason Mountain.

The entire survey area drains south to Cook Inlet. The north and central parts of the survey area drain through the Susitna River and its tributaries, which include the Hayes, Kahiltna, Kichatna, Nakochna, Skwentna, Talachulitna and Yentna Rivers. The south part of the survey area drains directly into Cook Inlet by major rivers which include the Beluga, Chuitna, Ivan, Kustatan, McArthur and Theodore Rivers and their tributaries, and by numerous streams.

The soils range from well to very poorly drained, and dominantly are poorly or very poorly drained. The well drained soils generally occur on the crests of remnant glacial features, on hill and mountain sideslopes, and on some alluvial terraces. The more poorly drained soils occur on all landforms, from tidal plains to alpine areas. The glacial till plain is characterized by the occurrence of many small and medium sized lakes, with both open and closed drainage systems, and by many streams. Several extensive lakes are in the survey area, including Beluga, Chelatna and Shell Lakes. The soils on the floodplains, muskegs and lower slopes of glacial remnants generally have a water table that is at or near the surface.

Permafrost occurs only in small acreages on moraines and footslopes in the upper and mid Yentna River valley. The permafrost generally is at a depth of less than 20 inches (51 cm) in the silty loess material. In these areas the permafrost is preserved by a thick surface cover of moss, which serves as insulating material. If the organic matter is removed, burned or otherwise disturbed, the permafrost may recede to a greater depth. The depth to which the permafrost may recede depends on several factors, such as the thickness of the organic layer, aspect, drainage, and the moisture content of the soil.

The areas that have potential for agricultural use generally are found on well drained terraces adjacent to major streams. Adapted crops include potatoes, hardy vegetables, perennial grasses and small grains. Microclimatic conditions will affect the length of the growing season and the performance of crops.

Climate

The climate of the survey area is transitional in character between the continental climate of Interior Alaska and the maritime climate of coastal areas.

Precipitation and temperature vary with proximity to the mountains and Cook Inlet. The climate data given in the tables and map units is extrapolated from data at Hayes River and Skwentna but does not reflect microclimatic variations which occur throughout the survey area. Variations in precipitation, temperature and frost free season can be expected throughout the survey area, along with the resulting differences in growing degree days and length of growing season.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Hayes River, and Skwentna, Alaska. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season. The mean annual precipitation is about 39 inches (99 cm) at Hayes River, and 29 inches (73 cm) at Skwentna. Of this, about 40 to 55 percent usually falls in April through September. The growing season for crops falls within this period. The heaviest rainfall occurs late in the growing season, but soil moisture from melted snow is adequate during the early part of the growing season. Thunderstorms occur in summer, but hail is rare.

In winter, the average temperature is about 15 °F at Hayes River and 11 °F at Skwentna. The average daily minimum temperature is about 7 °F at Hayes River and 1 °F at Skwentna. The lowest temperature on record, which occurred at Skwentna on January 11, 1972, is -51 °F In summer, the average temperature is about 54 °F at Hayes River and 56 °F at Skwentna. The average daily maximum temperature is about 64 °F at Hayes River and 67 °F at Skwentna. The highest recorded temperature, which occurred at Skwentna on July 11, 1947, is 90 °F.

Growing degree days are estimated to be about 1000-1500 in most years. A growing degree day is equivalent to a "heat unit" available for plant growth. During the frost free period, growing degree days accumulate by the amount that the average temperature each day exceeds the base temperature of 40 °F[1]. Limited climatic data for the area makes it impossible to calculate the number of growing degree days at specific locations within the soil survey area.

An average 123 inches (312 cm) of snow per season falls at Skwentna. The greatest snow depth at any one time during the period of record was 68 inches (172 cm). An average of 228 inches (579 cm) of snow per season falls at Hayes River. Seasonal accumulations are estimated to be greater at higher elevations.

Permafrost and Frost Action

Permafrost, or perennially frozen soil, is a minor concern in the Yentna Area. The permanently frozen soils in the Yentna Area occur on glacial remnants in the Yentna River valley.

These frozen soils occur from the upper reaches of the Yentna River to near its confluence with the Skwentna River. The permafrost soils have perennially frozen subsoil and are classified as Histic Pergelic Cryaquepts.

When moss or other insulating vegetation is removed from the surface of the soil, the uppermost part of the permafrost thaws. This commonly causes subsidence of the overlying soil material. Structures and trails constructed on permafrost soils are susceptible to uneven settling unless special construction methods are used. In summer, the soils are saturated in the zone above the permafrost. If the excess water is not removed, especially along trails, even more irregular subsidence is likely because the hazard of frost heaving in these soils is severe.

History

In the Upper Cook Inlet region, including the Yentna Area, little is known about the prehistory of the Tanania Indian inhabitants. Tanania Indians occupied the area at the time of the first European contact, although artifacts suggest that Eskimos inhabited the area prior to the Tanania Indians *(Darbyshire et al, 1981)*.

Exploration and settlement of the Cook Inlet area by European and Russian adventurers and tradesmen encouraged further expansion into the frontier. Captain Cook first explored Cook Inlet in 1778 and was followed by Dixon and Portlock in 1786 and Vancouver in 1794. Alaska was first explored by the Russians in the mid-1790's and a trading post was set up at Tyonek during this time. By the early 1800's the Russians were firmly established in the lower Cook Inlet region and were further exploring the territory. The earliest exploration up the Susitna River is believed to have been made in 1834 by a man named Malakoff. Alfred Brooks indicated that Russian maps dating back to 1845 reported some firsthand knowledge of the Susitna and Talkeetna Rivers *(Cole, 1985)*.

After Alaska changed from Russian to American jurisdiction, and from at least 1875, the major

[1] 40 degrees F. is the base temperature used for principal crops grown in Alaska. A base temperature of 50 degrees F. is used in the conterminous U.S., so direct comparison of growing degree days is not valid.

outpost for the Alaska Commercial Company in the Upper Cook Inlet was Tyonek *(Darbyshire et al, 1981)*. In the late 1890's and early 1900's, the area was overrun by gold prospectors on their way to the Willow Creek, upper Susitna River valley and the Iditarod-Innoko gold fields. Settlements and trading posts sprang up to support the commerce and shipping in the area and small freighters ran up the Susitna and Yentna rivers. Fishing camps or trading posts in the area included Tyonek, Alexander's, Beluga, Churchill, Ladd's and Nicholai. A fish saltery was established north of Tyonek in 1896 *(Darbyshire et al, 1981)* and a cannery was set up at Ladd's in 1902 *(Potter, 1967)*. Gold strikes included those in the Yentna and Susitna districts in 1906, in the Iditarod-Innoko district in 1908-09 and the Peters Creek area in 1911. A direct route to the Iditarod gold field was by railroad from Seward to Kern Creek and then by trail to Susitna Station, Hayes River and then on to Iditarod City, a total of 543 miles. The famous Iditarod Trail started at Knik and was fully established soon after the Iditarod-Innoko gold strike. The route had been known as early as 1898 as a result of Josiah E. Spurr's trip over it *(Potter, 1967)*. The trail is now used for recreation and for an annual world-famous sled dog race.

Present day settlements include Tyonek, Skwentna, the Beluga power generation station and various lodges and roadhouses scattered throughout the area. Natural gas is pumped from wells in Cook Inlet and from the Beluga gas field. Exploration has been done in the Capps and Chuitna coal fields for possible future production. Use of wildlife and fisheries' resource includes fishing and hunting for subsistence, recreation and trophy.

How This Survey Was Made

This survey was made to provide information about the soils and miscellaneous areas in the survey area. The information includes a description of the soils and miscellaneous areas and their location and a discussion of their suitability, limitations, and management for specified uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the material in which the soil formed. The material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils and miscellaneous areas in the survey area are in an orderly pattern that is related to the geology, landforms, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind or segment of the landscape. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landscape, soil scientists develop a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientists to predict, with a considerable degree of accuracy, the kind of soil or miscellaneous area at a specific location on the landscape.

Individual soils on the landscape commonly merge into one another as their characteristics gradually change. To construct an accurate map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted color, texture, size, and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, soil reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil Taxonomy *(United States Department of Agriculture, 1975)*, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses.

Predictions about soil behavior are based not only on soil properties but also on such variables as

climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, roads, and rivers, all of which help in locating boundaries accurately.

The descriptions, names, and delineations of the soils in this survey area do not fully agree with those of the soils in adjacent survey areas. Differences are the result of a better knowledge of soils, modifications in series concepts, or variations in the intensity of mapping or in the extent of the soils in the survey areas.

Detailed Soil Map Units

The map units delineated on the detailed maps at the back of this survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this section, along with the maps, can be used to determine the suitability and potential of a unit for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit is given under “Use and Management of the Soils” (page 63).

A map unit delineation on the detailed soil maps represents an area on the landscape and consists of one or more soils or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils or miscellaneous areas. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils and miscellaneous areas are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some "included" areas that belong to other taxonomic classes.

Most included soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, inclusions. They may or may not be mentioned in the map unit description. Other included soils and miscellaneous areas, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, inclusions. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. The included areas of contrasting soils or miscellaneous areas are mentioned in the map unit descriptions. A few included areas may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of included areas in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but if intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series* Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying layers. They also can differ in slope, stoniness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Puntilla silt loam, 7 to 20 percent slopes, is a phase of the Puntilla series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in

such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Nancy-Kashwitna complex, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Killey and Hiline silt loams, 0 to 2 percent slopes, is an undifferentiated group in this survey area.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Glaciers are an example.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables", page vii) give properties of the soils and the limitations, capabilities, and potentials for many uses. The glossary (page 111) defines many of the terms used in describing the soils or miscellaneous areas.

Map Unit Descriptions

201—Beaches

Position on landscape: This map unit consists of nearly barren sandy, silty and gravelly alluvial deposits, primarily in the Buluga Lake area. These areas are subject to sudden, frequent, and severe flooding caused by the rapid emptying of dammed glacial lakes. The flooding hazard makes these areas suitable only for wildlife and short-term recreational use. It is unsuitable for any long-term uses. Sparse vegetation may include scattered bluejoint grass and alder seedling.

202—Chedatna silt loam, 0 to 2 percent slopes

Composition

Chedatna soil and similar inclusions: 90 percent
Contrasting inclusions: 10 percent

Characteristics of the Chedatna Soil

Position on the landscape: alluvial terraces
Slope range: 0 to 2 percent
Slope features: plane to convex
Organic mat on surface: 2 to 4 inches (5 to 10 cm) thick
Native vegetation: white spruce, paper birch, cottonwood, ferns, and bluejoint grass

Typical profile:
*0 to 1 inch (0 to 2 cm)—gray silt loam
*1 to 3 inches (2 to 7 cm)—dark yellowish brown silt loam
*3 to 19 inches (7 to 48 cm)—dark grayish brown very fine sandy loam
*19 to 60 inches (48 to 150 cm)—dark grayish brown sand

Depth class: very deep
Drainage class: well drained
Permeability: in the loess mantle—moderate; in the sandy underlying material—rapid
Available water capacity: moderate
Runoff: slow
Depth to water table: greater than 60 inches (152 cm)
Hazard of erosion: by water—slight; by wind—severe
Depth to sand: 14 to 20 inches (35 to 50 cm)
Flooding: rare

Included Areas

*soils in depressional areas that are somewhat poorly drained
*soils in old stream channels that have gravelly alluvium at a depth of 10 to 30 inches (25 to 76 cm)
*stones and boulders may be on or near the surface in some areas

Major Uses

Current uses: wildlife habitat and recreation
Potential uses: hayland and pastureland, woodland, and rural homesites

Major Management Factors

Elevation: 50 to 500 feet (15 to 152 cm)
Climatic factors (average annual):
*precipitation—28 inches (71 cm)
*air temperature—32 °F (0 °C)
*growing degree days—1250 to 1500
Soil related factors: flooding, wind erosion, frost heaving, hazard of seepage, low fertility, and stones and boulders on the surface in some areas

Hayland and Pastureland

General management considerations:
*Most climatically adapted crops can be grown if protection from flooding is provided.
*Adequate cover must be maintained on the soil surface to prevent wind erosion.
*Crops respond to fertilizer and lime.
*In favorable years, the vegetation can be cut for native hay.
*Stones and boulders on or near the soil surface in some areas limit field operations.

Suitable management practices:
*Seed only the hay and pasture plants that tolerate periodic inundation.
*Reduce the risk of wind erosion by maintaining crop residue on the surface, using conservation tillage, and limiting the width of strips of unprotected soils.
*Windbreaks should be left as land clearing is done. They are needed to limit soil losses, maintain optimum crop yields, protect farm and ranch buildings, and provide cover for wildlife.
*Fertilize and lime according to soil test recommendations.

Woodland

The principal tree species are white spruce, paper birch, and balsam poplar.

Estimated Mean site index (100 year site curve) for white spruce: 74

General management considerations:
*Seeding is advisable if the soil has been disturbed by logging or fire.
*If seed trees are in the stand, reforestation generally occurs naturally in cutover areas.
*Mortality of seedlings may be high in areas that are subject to flooding.
*Trees suitable for planting include white spruce.

Suitable management practices:
*Use conventional equipment in harvesting, but limit its use when the soil is wet.
*Reduce the risk of erosion by seeding roads, cutbanks, and landings, and avoiding excessive disturbance on the soil surface.
*Help to insure establishment and survival of seedlings by selecting adapted plants.

Building Site Development

General management considerations:
*Conventional sewage treatment systems can be expected to function poorly because of wetness in some areas during periods of flooding.
*The risk of seepage and the hazard of polluting the water supply limit the use of this unit for a conventional sewage treatment system.
*Excavation can expose soil material that is highly susceptible to wind erosion.
*Stones and boulders may be on or near the soil surface in some areas and interfere with construction practices.
*Frost action limits construction of access roads, driveways, and buildings.

Suitable management practices:
*Reduce the risk of flooding by locating structures above the expected flood level.
*Protect on-site sewage disposal systems from flooding.
*Preserve the existing plant cover during construction to reduce the risk of erosion.
*Consider the depth to which frost penetrates in designing footings and road bases.

Wildlife

This map unit provides habitat for moose, bears, porcupines, birds, and hares.

203—Chichantna peat, 0 to 8 percent slopes

Composition

Chichantna soil and similar inclusions: 90 percent
Contrasting inclusions: 10 percent

Characteristics of the Chichantna Soil

Position on the landscape: muskegs and depressional areas
Slope range: 0 to 8 percent
Slope features: shape—concave
Native vegetation: mosses, sedges, bog birch, and ericaceous shrubs

Typical profile:
*0 to 15 inches (0 to 38 cm)—dark reddish brown peat
*15 to 16 inches (38 to 40 cm)—light olive brown fine sandy loam
*16 to 28 inches (40 to 71 cm)—dark reddish brown muck
*28 to 35 inches (71 to 88 cm)—olive yellow loam

*35 to 64 inches (88 to 162 cm)—dark reddish brown muck

Depth class: very deep
Drainage class: very poorly drained
Permeability: in the stratified loamy material—moderate; in the organic material—rapid
Available water capacity: very high
Runoff: ponded to medium
Depth to water table: 0 to 6 inches (0 to 15 cm), except on the steeper slopes where it may be 8 to 16 inches (20 to 40 cm) below the organic surface

Included Areas

Contrasting inclusions:
*small lakes
*soils in similar positions that have continuous mineral material below 12 inches (30 cm)
*stones and boulders may be on or near the surface in some areas

Major Uses

Current uses: wildlife habitat and recreation

Major Management Factors

Elevation: 50 to 2000 feet (15 to 609 m)
Climatic factors (average annual):
*precipitation—28 inches (71 cm)
*air temperature—32 °F (0 °C)
*growing degree days—1250 to 1500
Soil related factors: depth to water table, frost heaving, low strength, and subsidence

Wildlife

This map unit provides habitat for beaver, moose, bears, waterfowl, and muskrats.

204—Chuit-Nakochna-Chichantna complex, 2 to 7 percent slopes

Composition

Chuit soil and similar inclusions: 40 percent
Nakochna soil and similar inclusions: 25 percent
Chichantna soil and similar inclusions: 20 percent
Contrasting inclusions: 15 percent

Characteristics of the Chuit Soil

Position on the landscape: mountain sideslopes
Slope range: 2 to 7 percent
Slope features: shape—convex
Organic mat on surface: 0 to 4 inches (0 to 10 cm) thick
Native vegetation: mosses, lichens, dwarf birch, prostrate willows, and ericaceous shrubs

Typical profile:
*0 to 1 inch (0 to 2 cm)—dark brown silt loam
*1 to 4 inches (2 to 10 cm)—black silt loam
*4 to 9 inches (10 to 22 cm)—very dark brown silt loam
*9 to 17 inches (22 to 43 cm)—yellowish brown silt loam
*17 to 33 inches (43 to 83 cm)—dark brown silt loam
*33 to 60 inches (83 to 150 cm)—yellowish brown gravelly silt loam

Depth class: very deep
Drainage class: well drained
Permeability: in the loess mantle—moderate; in the glacial till substratum—moderately slow
Available water capacity: very high
Runoff: slow to medium
Depth to water table: greater than 72 inches (183 cm)
Depth to firm glacial till substratum: 20 to 38 inches (50 to 96 cm)
Hazard of erosion: by water—slight; by wind—severe
Rooting-restricting feature: firm glacial till substratum at a depth of 20 to 38 inches (50 to 96 cm)

Characteristics of the Nakochna Soil

Position on the landscape: mountain sideslopes and ridges
Slope range: 2 to 7 percent
Slope features: shape—convex
Organic mat on surface: 1 to 4 inches (2 to 10 cm) thick
Native vegetation: mosses, lichens, dwarf birch, prostrate willows, and ericaceous shrubs

Typical profile:
*0 to 2 inches (0 to 5 cm)—very dark brown silt loam
*2 to 3 inches (5 to 7 cm)—dark grayish brown silt loam
*3 to 4 inches (7 to 10 cm)—dark reddish brown silt loam
*4 to 7 inches (10 to 15 cm)—very dusky red silt loam
*7 to 12 inches (15 to 30 cm)—dark reddish brown silt loam

*12 to 17 inches (30 to 43 cm)—brown gravelly silt loam
*17 inches (43 cm)—hard granite bedrock

Depth class: shallow, 14 to 20 inches (35 to 50 cm) to hard bedrock
Drainage class: well drained
Permeability: in the loess mantle—moderate
Available water capacity: low
Depth to hard bedrock: 14 to 20 inches (35 to 50 cm)
Runoff: medium
Depth to water table: greater than 72 inches (183 cm)
Hazard of erosion: by water—slight; by wind—severe
Root-restricting feature: bedrock at a depth of 14 inches (35 to 50 cm)

Characteristics of the Chichantna Soil

Position on the landscape: muskegs
Slope range: 2 to 5 percent
Slope features: shape—concave
Native vegetation: mosses, sedges, bog birch, ericaceous shrubs, and dwarf willows

Typical profile:
*0 to 15 inches (0 to 38 cm)—dark reddish brown peat
*15 to 16 inches (38 to 40 cm)—light olive brown fine sandy loam
*16 to 28 inches (40 to 71 cm)—dark reddish brown muck
*28 to 35 inches (71 to 88 cm)—olive yellow loam
*35 to 64 inches (88 to 162 cm)—dark reddish brown muck

Depth class: very deep
Drainage class: very poorly drained
Permeability: in the organic material—rapid; in the thin stratified loamy material—moderate
Available water capacity: very high
Runoff: ponded to medium
Depth to water table: 0 to 6 inches (0 to 15 cm)

Included Areas

*small lakes
*soils with stones and boulders on or near the surface
*soils on similar landscape positions that have bedrock within 40 inches to 60 inches (100 to 150 cm) of the surface
*rock outcroppings

Major Uses

Current uses: wildlife habitat and recreation

Major Management Factors

Elevation: 50 to 4000 feet (15 to 1219 cm)
Climatic factors (average annual):
*precipitation—28 inches (71 cm)
*air temperature—30 °F (-1 °C) estimated
*growing degree days—less than 900
Soil related factors: depth to water table, depth to bedrock, depth to firm glacial till and rock outcroppings, and frost churning

Wildlife

This unit provides habitat for moose, bears, foxes, wolves, waterfowl, hawks, shrews, and voles.

205—Chuit-Nakochna-Rubble land complex, 7 to 45 percent slopes

Composition

Chuit soil and similar inclusions: 30 percent
Nakochna soil and similar inclusions: 30 percent
Rubble land: 25 percent
Contrasting inclusions: 15 percent

Characteristics of the Chuit Soil

Positions on landscape: mountain sideslopes
Slope range: 7 to 45 percent
Slope features: shape—convex
Organic mat on surface: 0 to 4 inches (0 to 10 cm) thick
Native vegetation: mosses, lichens, dwarf birch, prostrate willows, and ericaceous shrubs

Typical profile:
*0 to 1 inch (0 to 2 cm)—dark brown silt loam
*1 to 4 inches (2 to 10 cm)—black silt loam
*4 to 9 inches (10 to 22 cm)—very dark brown silt loam
*9 to 17 inches (22 to 43 cm)—yellowish brown silt loam
*17 to 33 inches (43 to 83 cm)—dark brown silt loam
*33 to 60 inches (83 to 150 cm)—yellowish brown gravelly silt loam

Depth class: very deep

Drainage class: well drained
Permeability: in the loess mantle—moderate; in the glacial till substratum—moderately slow
Available water capacity: very high
Runoff: medium to rapid
Depth to water table: greater than 72 inches (183 cm)
Depth to firm glacial till substratum: 20 to 38 inches (50 to 96 cm)
Hazard of erosion: by water—slight to severe; by wind—severe
Root-restricting feature: firm glacial till at a depth of 20 to 38 inches (50 to 96 cm)

Characteristics of the Nakochna Soil

Position on the landscape: mountain sideslopes and ridges
Slope range: 7 to 45 percent
Slope features: shape—convex
Organic mat on surface: 1 to 4 inches (2 to 10 cm) thick
Native vegetation: mosses, lichens, dwarf birch, prostrate willows, and ericaceous shrubs

Typical profile:
*0 to 2 inches (0 to 5 cm)—grayish brown silt loam
*2 to 3 inches (5 to 7 cm)—dark grayish brown silt loam
*3 to 4 inches (7 to 10 cm)—dark reddish brown silt loam
*4 to 7 inches (10 to 15 cm)—very dusky red silt loam
*7 to 12 inches (15 to 30 cm)—dark reddish brown silt loam
*12 to 17 inches (30 to 43 cm)—brown gravelly silt loam
*17 inches (43 cm)—hard granite bedrock

Depth class: shallow, 14 to 20 inches (35 to 50 cm) to hard bedrock
Drainage class: well drained
Permeability: in the loess mantle—moderate
Available water capacity: low
Runoff: rapid
Depth to water table: greater than 72 inches (183 cm)
Hazard of erosion: by water—moderate to severe; by wind—severe
Depth to hard bedrock: 14 to 20 inches (35 to 50 cm)
Root-restricting feature: bedrock at a depth of 14 to 20 inches (35 to 50 cm)

Rubble Land

This portion of the map unit consists of exposed bedrock and boulder fields that support a vegetative cover of lichens and few mosses. Small pockets of soil material may be found in the cracks of the bedrock and the interstices of the boulder fields.

Included Areas

*soils on similar landscape positions that have bedrock within 40 to 60 inches (100 to 150 cm) of the surface
*soils with stones and boulders on or near the surface
*muskegs

Major Uses

Current uses: wildlife habitat

Major Management Factors

Elevation: 1000 to 4500 feet (304 to 1371 m)
Climatic factors (average annual):
*precipitation—28 inches (71 cm)
*air temperature—30 °F (-1 °C) estimated
*growing degree days—less than 900
Soil related factors: stones and boulders on the surface, depth to bedrock, depth to glacial till substratum, rock outcroppings and slope, and frost churning

Wildlife

This map unit provides habitat for ground squirrels, shrews, voles, hawks, bears, wolves, foxes, coyotes, ptarmigan, and other openland birds.

206—Chuit and Nakochna silt loams, 3 to 30 percent slopes

Composition

Chuit and Nakochna soils and similar inclusions: 85 percent
Contrasting inclusions: 15 percent

Characteristics of the Chuit Soil

Position on the landscape: mountain sideslopes
Slope range: 3 to 30 percent

Slope features: shape—convex
Organic mat on surface: 0 to 4 inches (0 to 10 cm) thick
Native vegetation: mosses, lichens, dwarf birch, prostrate willows, and ericaceous shrubs
Typical profile:
*0 to 1 inch (0 to 2 cm)—dark brown silt loam
*1 to 4 inches (2 to 10 cm)—black silt loam
*4 to 9 inches (10 to 22 cm)—very dark brown silt loam
*9 to 17 inches (22 to 43 cm)—yellowish brown silt loam
*17 to 33 inches (43 to 83 cm)—dark brown silt loam
*33 to 60 inches (83 to 150 cm)—yellowish brown gravelly silt loam

Depth class: very deep
Drainage class: well drained
Permeability: in the loess mantle—moderate; in the glacial till substratum—moderately slow
Available water capacity: very high
Runoff: slow to rapid
Depth to water table: greater than 72 inches (183 cm)
Hazard of erosion: by water—slight to severe; by wind—severe
Depth to firm glacial till substratum: 20 to 38 inches (50 to 96 cm)
Root-restricting feature: firm glacial till at a depth of 20 to 38 inches (50 to 96 cm)

Characteristics of the Nakochna Soil

Position on the landscape: mountain sideslopes
Slope range: 3 to 30 percent
Slope features: shape—convex
Organic mat on surface: 1 to 4 inches (2 to 10 cm) thick
Native vegetation: mosses, lichens, dwarf birch, prostrate willows, and ericaceous shrubs
Typical profile:
*0 to 2 inches (0 to 5 cm)—very dark brown silt loam
*2 to 3 inches (5 to 7 cm)—dark grayish brown silt loam
*3 to 4 inches (7 to 10 cm)—dark reddish brown silt loam
*4 to 7 inches (10 to 15 cm)—very dusky red silt loam
*7 to 12 inches (15 to 30 cm)—dark reddish brown silt loam
*12 to 17 inches (30 to 43 cm)—brown gravelly silt loam
*17 inches (43 cm)—hard granite bedrock

Depth class: shallow, 14 to 20 inches (35 to 50 cm) to hard bedrock
Drainage class: well drained
Permeability: in the loess mantle—moderate
Available water capacity: low
Runoff: slow to rapid
Depth to water table: greater than 72 inches (183 cm)
Hazard of erosion: by water—slight to severe; by wind—severe
Root-restricting feature: bedrock at a depth of 14 to 20 inches (35 to 50 cm)
Depth to hard bedrock: 14 to 20 inches (35 to 50 cm)

Included Areas

*muskegs
*rock outcroppings
*soils with stones and boulders on or near the surface

Major Uses

Current uses: wildlife habitat and recreation

Major Management Factors

Elevation: 1000 to 4500 feet (304 to 1371 m)
Climatic factors (average annual):
*precipitation—28 inches (71 cm)
*air temperature—30 °F (-1 °C) estimated
*growing degree days—less than 900
Soil related factors: depth to bedrock, depth to glacial till substratum, rock outcroppings and slope, stones and boulders on the surface, and frost churning (Figure 2)

Wildlife

This map unit provides habitat for ground squirrels, shrews, voles, hawks, bears, wolves, foxes, coyotes, ptarmigan, and other openland birds.

207—Clunie peat, 0 to 2 percent slopes

Composition

Clunie soil and similar inclusions: 95 percent
Contrasting inclusions: 5 percent

Characteristics of the Clunie Soil

Position on the landscape: tidal flats
Slope range: 0 to 2 percent
Slope features: shape—concave

Organic mat on surface: 24 to 40 inches (60 to 160 cm) thick
Native vegetation: mosses, sedges, and rushes

Typical profile:
*0 to 33 inches (0 to 83 cm)—dark gray sphagnum moss and sedge peat
*33 to 63 inches (83 to 160 cm)—dark gray silty clay loam

Depth class: very deep, more than 60 inches (150 to cm)
Drainage class: very poorly drained
Permeability: in the organic materials—rapid; in the underlying tidal material—very slow
Available water capacity: very high
Runoff: ponded to very slow
Depth to water table: +12 to 12 inches (+30 to 30 cm)
Flooding: frequent

In addition to spring and summer flooding hazard, intense freezing causes a winter flooding hazard.

Included Areas

*riverwash
*numerous streams and small lakes

Major Uses

Current uses: wildlife habitat and recreation

Major Management Factors

Elevation: 0 to 50 feet (0 to 15 m)
Climatic factors (average annual):
*precipitation—28 inches (71 cm)
*air temperature—32 °F (0 °C)
*growing degree days—1250 to 1500
Soil related factors: flooding, depth to water table, and subsidence

Wildlife

This map unit provides habitat for waterfowl, muskrats, beaver, and moose.

208—Doroshin peat, 0 to 5 percent slopes

Composition

Doroshin soil and similar inclusions: 90 percent
Contrasting inclusions: 10 percent

Characteristics of the Doroshin Soil

Position on the landscape: muskegs
Slope range: 0 to 5 percent
Slope features: shape—concave
Organic mat on surface: 16 to 48 inches (40 to 121 cm) thick
Native vegetation: sedges, sphagnum moss, forbs, ericaceous shrubs, and scattered black spruce

Typical profile:
*0 to 25 inches (0 to 63 cm)—black and dark reddish brown decomposing peat
*25 to 60 inches (63 to 150 cm)—yellowish brown and light gray loam

Depth class: very deep, more than 60 inches (150 cm)
Drainage class: very poorly drained
Permeability: in the organic material—rapid; in the mineral substratum—moderate
Available water capacity: high
Runoff: none to slow
Depth to water table: 0 to 12 inches (0 to 30 cm)

Included Areas

Contrasting inclusions:
*very poorly drained mineral soils on moraine footslopes that are loess material in the upper 15 to 35 inches (38 to 88 cm) and have firm glacial till substratum
*small lakes

Major Uses

Current uses: wildlife habitat and recreation

Major Management Factors

Elevation: 50 to 1500 feet (15 to 457 m)
Climatic factors (average annual):
*precipitation—28 inches (71 cm)
*air temperature—32 °F (0 °C)
*growing degree days—1250 to 1500
Soil related factors: depth to water table

Wildlife

This map unit provides habitat for moose, birds, bears, waterfowl, and beavers.

209—Cryaquents, tidal

Composition

Cryaquents, tidal soils and similar inclusions: 85 percent
Contrasting inclusions: 15 percent

Characteristics of the Cryaquents, Tidal Soil

Position on the landscape: tidal flats
Slope range: 0 to 2 percent
Slope features: shape—plane to concave
Organic mat on surface: 2 to 6 inches (5 to 15 cm) thick
Native vegetation: sedges and mosses

Typical profile:
*0 to 20 inches (0 to 50 cm)—dark gray silt loam with thin strata of loam and silty clay loam
*20 to 60 inches (50 to 150 cm)—dark gray silty clay loam with strata of loam and silt loam

Depth class: very deep
Drainage class: very poorly drained
Permeability: very slow to moderate
Available water capacity: high
Runoff: ponded to slow
Depth to water table: 0 to 6 inches (0 to 15 cm)
Hazard of erosion: by water—slight; by wind severe
Flooding: frequent—subject to fresh water overflow from stream as well as tidal inundation

Included Areas

Contrasting inclusions:
*organic soils
*numerous small streams channels
*small lakes

Major Uses

Current uses: wildlife habitat and recreation

Major Management Factors

Elevation: 0 to 50 feet (0 to 15 m)
Climatic factors (average annual):
*precipitation—28 inches (71 cm)
*air temperature—32 °F (0 °C) estimated
*growing degree days—1250 to 1500
Soil related factors: flooding and depth to water table

Wildlife

This map unit provides habitat for waterfowl, moose, beaver, and muskrats.

210—Glaciers

Position on landscape: This map unit consists of large masses of ice formed by the compaction and recrystallization of snow. The glaciers enter the survey area from the eastern and southern slopes of the Alaska Range and the eastern slope of the Aleutian Range. Barren ground at the terminus of the glaciers consists of unsorted rock and rock-covered ice and may extend several miles from the bare ice of the glacier. Wildlife found in these areas generally are in transit from one alpine area to another.

211—Hewitt peat, 0 to 2 percent slopes

Composition

Hewitt soil and similar inclusions: 90 percent
Contrasting inclusions: 10 percent

Characteristics of the Hewitt Soil

Position on the landscape: muskegs on floodplains
Slope range: 0 to 2 percent
Slope features: shape—concave
Organic mat on surface: 25 to 50 inches (63 to 127 cm) thick
Native vegetation: mosses, sedges, bog birch, forbs, and ericaceous shrubs

Typical profile:
*0 to 7 inches (0 to 17 cm)—dark yellowish brown and dark brown peat
*7 to 12 inches (17 to 30 cm)—dark greenish gray silty clay loam
*12 to 33 inches (30 to 83 cm)—very dark grayish brown mucky peat with strata of dark greenish gray silt loam
*33 to 60 inches (83 to 150 cm)—dark gray silt loam with few thin strata of peat

Depth class: very deep
Drainage class: very poorly drained
Permeability: in the organic materials—rapid; in the mineral substratum—slow

Available water capacity: very high
Runoff: ponded to slow
Depth to water table: 0 to 6 inches (0 to 15 cm)
Hazard of erosion: by water—slight; by wind—slight
Flooding: occasional
Depth to underlying mineral substratum: 25 to 50 inches (63 to 127 cm)

Included Areas

Contrasting inclusions:
*soils in old stream channels that have a silty surface mantle
*soils on slightly higher landscape positions that are rarely flooded
*soils on similar positions that have sand and gravel at a depth of 20 to 60 inches (50 to 150 cm)
*stream channels
*small lakes

Major Uses

Current uses: wildlife habitat and recreation

Major Management Factors

Elevation: 15 to 1000 feet (5 to 304 m)
Climatic factors (average annual):
*precipitation—28 inches (71 cm)
*air temperature—32 °F (0 °C) estimated
*growing degree days—1250 to 1500
Soil related factors: flooding, depth to water table, and inadequate drainage outlets

Wildlife

This map unit provides habitat for moose, bears, waterfowl, beaver, and muskrats.

212—Histic Pergelic Cryaquepts-Starichkof complex, 0 to 7 percent slopes

Composition

Histic Pergelic Cryaquepts soil and similar inclusions: 45 percent
Starichkof soil and similar inclusions: 40 percent
Contrasting inclusions: 15 percent

Characteristics of the Histic Pergelic Cryaquepts Soil

Position on the landscape: moraines and mountain footslopes
Slope range: 0 to 7 percent
Slope features: shape—plane to convex
Organic mat on surface: 8 to 12 inches (20 to 30 cm) thick
Native vegetation: black spruce, mosses, horsetail, and Labrador tea
Typical profile:
*+11 inches to 0 inches (+27 to 0 cm)—peat
*0 to 5 inches (0 to 12 cm)—frozen black silt loam
*5 to 8 inches (12 to 20 cm)—frozen dark brown silt loam
*8 to 14 inches (20 to 35 cm)—frozen brown silt loam
*14 to 15 inches (35 to 38 cm)—frozen black silt loam
*15 to 17 inches (38 to 43 cm)—frozen brown silt loam

Depth class: very shallow to shallow, 0 to 20 inches (0 to 50 cm) to permafrost
Drainage class: very poorly drained
Permeability: above the permafrost—moderately rapid; in the permafrost—impermeable
Available water capacity: very high
Depth to permafrost: 0 to 20 inches (0 to 50 cm)
Runoff: slow
Depth to water table: 0 to 20 inches (0 to 50 cm)
Hazard of erosion: by water—moderate; by wind—slight
Root-restricting feature: permafrost at a depth of 0 to 20 inches (0 to 50 cm)

Characteristics of the Starichkof Soil

Position on the landscape: muskegs
Slope range: 0 to 2 percent
Slope features: shape—concave
Native vegetation: mosses, sedges, scattered black spruce, bog birch, and Labrador tea

Typical profile:
*0 to 27 inches (0 to 68 cm)—dark brown peat
*27 to 30 inches (68 to 76 cm)—grayish brown fine sandy loam
*30 to 40 inches (76 to 100 cm)—dark brown peat
*40 to 41 inches (100 to 104 cm)—grayish brown silt loam
*41 to 63 inches (104 to 160 cm)—dark brown peat

Depth class: very deep
Drainage class: very poorly drained
Permeability: rapid
Available water capacity: very high
Runoff: ponded to slow

Depth to water table: +12 to 6 inches (+30 to 15 cm)

Included Areas

Contrasting inclusions:
*soils on similar landscape positions that do not have permafrost
*streams and small lakes
*soils with stones and boulders on or near the surface

Major Uses

Current uses: wildlife habitat and recreation

Major Management Factors

Elevation: 200 to 900 feet (60 to 274 cm)
Climatic factors (average annual):
*precipitation—28 inches (71 cm)
*air temperature—31 °F (-0.5 °C) estimated
*growing degree days—less than 900
Soil related factors: permafrost, depth to water table, and rooting depth

Wildlife

This map unit provides habitat for moose, bears, waterfowl, foxes, and coyotes.

213—Homestead silt loam, 0 to 2 percent slopes

Composition

Homestead soil and similar inclusions: 85 percent
Contrasting inclusions: 15 percent

Characteristics of the Homestead Soil

Position on the landscape: outwash plains
Slope range: 0 to 2 percent
Slope features: plane
Organic mat on surface: 1 to 3 inches (2 to 7 cm) thick
Native vegetation: balsam poplar, white spruce, and paper birch

Typical profile:
*0 to 2 inches (0 to 5 cm)—dark grayish brown silt loam
*2 to 3 inches (5 to 7 cm)—dark brown silt loam
*3 to 8 inches (7 to 20 cm)—brown silt loam
*8 to 40 inches (20 to 100 cm)—brown very gravelly medium sand
*40 to 60 inches (100 to 150 cm)—brown extremely gravelly medium sand

Depth class: very deep
Drainage class: well drained
Permeability: in the loess mantle—moderate; in the substratum—rapid
Available water capacity: low
Depth to the sand and gravel substratum: 4 to 10 inches (10 to 25 cm)
Runoff: slow
Depth to water table: greater than 72 inches (183 cm)
Hazard of erosion: by water—slight; by wind severe

Included Areas

Contrasting inclusions:
*soils on similar landscape positions that are poorly drained or very poorly drained
*muskegs
*soils with stones and boulders on or near the surface

Major Uses

Current uses: wildlife habitat and recreation
Potential uses: hayland, pastureland, and rural homesites

Major Management Factors

Elevation: 50 to 500 feet (15 to 152 m)
Climatic factors (average annual):
*precipitation—28 inches (71 cm)
*air temperature—32 °F (0 °C) estimated
*growing degree days—1250 to 1500
Soil related factors: available water capacity, depth to sand and gravelly substratum, wind erosion, flooding, frost heaving, hazard of seepage, and low fertility

Hayland and Pastureland

General management considerations:
*Most climatically adapted grasses can be grown if they are adequately fertilized and limed.
*Suitable species for planting are adapted grasses such as brome, timothy, and bluejoint.
*Soils may be droughty during years of low precipitation.
*Stones and boulders on or near the surface of the soil in some areas limit field operations.

Suitable management practices:
*Maintain or improve fertility by fertilizing and liming according to soil test results.
*Keep in permanent pasture or native plant cover to

protect from erosion and to maintain available soil moisture.

Building Site Development

General management considerations:
*Excavation can expose soil material that is highly susceptible to wind erosion.
*Frost action limits construction of access roads, driveways, and buildings.
*The risk of seepage and the hazard of polluting the water supply limit the use of this unit for a conventional sewage treatment system.
*The rapid permeability of the substratum may allow effluent from moderate or high density housing to pollute the water table.

Suitable management practices:
*Reduce the risk of flooding by locating structures above the expected flood level.
*Reduce the risk of erosion by stabilizing areas that have been disturbed.
*Consider the depth to which frost penetrates in designing footings and road bases.
*Protect conventional waste treatment systems from flooding.

Wildlife

This map unit provides habitat for bears, moose, coyotes, foxes, and hares.

214—Killey and Hiline silt loams, 0 to 2 percent slopes

Composition

Killey and Hiline soils and similar inclusions: 85 percent
Contrasting inclusions: 15 percent

Characteristics of the Killey Soil

Position on the landscape: floodplains
Slope range: 0 to 2 percent
Slope features: shape—concave to convex
Organic mat on surface: 1 to 3 inches (2 to 7 cm) thick
Native vegetation: willows, bluejoint grass, and alders
Typical profile:
*0 to 8 inches (0 to 20 cm)—brown silt loam
*8 to 22 inches (20 to 55 cm)—gray loam
*22 to 38 inches (55 to 96 cm)—light brownish gray sand
*38 to 63 inches (96 to 159 cm)—olive very gravelly sand

Depth class: very deep
Drainage class: very poorly drained
Permeability: in the loamy material—moderate; in the sand and gravel—rapid
Available water capacity: moderate
Depth to sand and gravel: 20 to 40 inches (50 to 100 cm)
Runoff: slow
Depth to water table: 0 to 18 inches (0 to 45 cm)
Hazard of erosion: by water—severe; by wind—slight
Flooding: frequent

In addition to spring and summer flooding hazard, intense freezing causes a winter flooding hazard.

Characteristics of the Hiline Soil

Position on the landscape: floodplains and stream terraces
Slope range: 0 to 2 percent
Slope features: shape—concave to convex
Organic mat on surface: 2 to 6 inches (5 to 15 cm) thick
Native vegetation: willow, bluejoint grass, and alders

Typical profile:
*0 to 3 inches (0 to 7 cm)—dark gray silt loam
*3 to 41 inches (7 to 104 cm)—gray fine sandy loam and silt loam
*41 to 60 inches (104 to 150 cm)—grayish brown gravelly sand

Depth class: very deep
Drainage class: very poorly drained
Permeability: in the loamy material—moderate; in the sandy and gravelly underlying material—rapid
Available water capacity: moderate
Depth to sand and gravel: more than 40 inches (more than 100 cm)
Runoff: slow
Depth to water table: 0 to 18 inches (0 to 45 cm)
Hazard of erosion: by water—severe; by wind-slight
Flooding: frequent

In addition to spring and summer flooding hazard, intense freezing causes a winter flooding hazard.

Included Areas

*soils on similar landscape positions that are well drained

*soils on floodplains that have organic surfaces thicker than 8 inches (20 cm)
*soils on similar landscape positions that have silty clay loam substrata
*muskegs
*numerous stream channels
*small lakes caused by beaver activity
*soils with stones or boulders on or near the surface

Major Uses

Current uses: wildlife habitat and recreation
Potential uses: hayland and pastureland

Major Management Factors

Elevation: 25 to 1500 feet (7 to 457 m)
Climatic factors (average annual):
*precipitation—28 inches (71 cm)
*air temperature—32 °F (0 °C)
*growing degree days—about 1250 to 1500
Soil related factors: stones and boulders on the surface in some areas, depth to water table, flooding, water erosion, and low fertility

Hayland and Pastureland

General management considerations:
*Crops respond to fertilizer and lime.
*Wetness limits the choice of plants.
*Providing drainage is difficult because most areas are seasonally flooded.
*Numerous stream channels and small lakes limit accessibility and field operations.
*Stones and boulders on or near the surface of the soil in some areas limit field operations.

Suitable management practices:
*Seed only the hay and pasture plants that tolerate periodic inundation and seasonal wetness such as creeping foxtail.
*Maintain or improve fertility by using climatically adapted crops and fertilize and lime according to soil test results.
*Reduce the risk of water erosion by keeping in permanent cover of native or adapted species.

Wildlife

This map unit provides habitat for moose, water fowl, beaver, muskrats, and hawks.

215—Kliskon silt loam, 2 to 12 percent slopes

Composition

Kliskon soil and similar inclusions: 90 percent
Contrasting inclusions: 10 percent

Characteristics of the Kliskon Soil

Position on the landscape: mountain side slopes
Slope range: 2 to 12 percent
Slope features: shape—concave to convex
Organic mat on surface: 1 to 3 inches (2 to 7 cm) thick
Native vegetation: bluejoint grass, alders, willows, and forbs

Typical profile:
*0 to 2 inches (0 to 5 cm)—dark grayish brown silt loam
*2 to 19 inches (5 to 48 cm)—brown to dark reddish brown silt loam
*19 to 60 inches (48 to 150 cm)—olive brown gravelly loam

Depth class: very deep
Drainage class: poorly drained
Permeability: in the loess mantle—moderate; in the glacial till substratum—moderately slow
Available water capacity: very high
Runoff: slow to medium
Depth to water table: 18 to 30 inches (45 to 76 cm)
Hazard of erosion: by water—severe; by wind—severe
Depth to firm glacial till substratum: 10 to 20 inches (25 to 50 cm)
Root-restricting feature: firm glacial till substratum at a depth of 10 to 20 inches (25 to 50 cm)

Included Areas

*soils on similar landscape positions that are well drained
*soils on similar landscape positions that have a water table at or near the surface during the growing season

Major Uses

Current uses: wildlife habitat and recreation
Potential uses: rangeland

Major Management Factors

Elevation: 600 to 2000 feet (182 to 609 m)
Climatic factors (average annual):
*precipitation—28 inches (71 cm)
*air temperature—31 °F (-0.5 °C) estimated
*growing degree days—less than 1250 estimated
Soil related factors: depth to glacial till substratum, depth to water table, water erosion, wind erosion, rooting depth, slope, and stone and boulder size erratics on or near the surface in some areas

Wildlife

This map unit provides habitat for moose, bears, coyotes, shrews, voles, and ptarmigan.

216—Kroto-Strandline-Cryorthents complex, 30 to 45 percent slopes

Composition

Kroto soil and similar inclusions: 35 percent
Strandline soil and similar inclusions: 30 percent
Cryorthents soil and similar inclusions: 20 percent
Contrasting inclusions: 15 percent

Characteristics of the Kroto Soil

Position on the landscape: moraines, hills, and mountain footslopes
Slope range: 30 to 45 percent
Slope features: shape—plane to convex
Organic mat on surface: 1 to 4 inches (2 to 10 cm) thick
Native vegetation: white spruce, paper birch, bluejoint grass, alders, and forbs

Typical profile:
*0 to 2 inches (0 to 5 cm)—gray silt loam
*2 to 4 inches (5 to 10 cm)—dark reddish brown silt loam
*4 to 6 inches (10 to 15 cm)—strong brown silt loam
*6 to 12 inches (15 to 30 cm)—yellowish brown and dark yellowish brown silt loam
*12 to 14 inches (30 to 35 cm)—grayish brown silt loam
*14 to 19 inches (35 to 48 cm)—brown silt loam
*19 to 60 inches (48 to 150 cm)—olive brown gravelly silt loam
Depth class: very deep
Drainage class: well drained
Permeability: in the loess mantle—moderate; in the firm glacial till substratum—moderately slow
Available water capacity: very high
Depth to firm glacial till substratum: 10 to 20 inches (25 to 50 cm)
Runoff: rapid
Depth to water table: greater than 72 inches (183 cm)
Hazard of erosion: by water—severe; by wind—severe
Root-restricting feature: firm glacial till substratum at a depth of 10 to 20 inches (25 to 50 cm)

Characteristics of the Strandline Soil

Position on the landscape: moraines and mountain footslopes
Slope range: 30 to 40 percent
Slope features: shape—plane to convex
Organic mat on surface: 1 to 4 inches (2 to 10 cm) thick
Native vegetation: white spruce, paper birch, bluejoint grass, alders, and forbs
Typical profile:
*0 to 2 inches (0 to 5 cm)—dark reddish brown silt loam
*2 to 5 inches (5 to 12 cm)—gray silt loam
*5 to 8 inches (12 to 20 cm)—dark reddish brown silt loam
*8 to 15 inches (20 to 38 cm)—dark brown silt loam
*15 to 20 inches (38 to 50 cm)—dark yellowish brown and brownish yellow silt loam
*20 to 22 inches (50 to 55 cm)—gray silt loam
*22 to 26 inches (55 to 66 cm)—dark yellowish brown silt loam
*26 to 31 inches (66 to 78 cm)—dark grayish brown silt loam
*31 to 60 inches (78 to 150 cm)—olive gray gravelly silt loam

Depth class: very deep
Drainage class: well drained
Permeability: in the loess mantle—moderate; in the firm glacial till substratum—moderately slow
Available water capacity: very high
Depth to firm glacial till substratum: 20 to 37 inches (50 to 93 cm)
Runoff: rapid
Depth to water table: greater than 72 inches (183 cm)
Hazard of erosion: by water—severe; by wind—severe
Root-restricting feature: firm glacial till substratum at a depth of 20 to 37 inches (50 to 93 cm)

Characteristics of the Cryorthents Soil

Position on the landscape: escarpments on moraines, drumlins, and mountain sideslopes

Slope range: 35 to 45 percent
Slope features: shape—plane
Native vegetation: sparse cover of bluejoint grass and alder seedlings

Typical profile:
*0 to 1 inch (0 to 2 cm)—dark grayish brown silt loam
*1 to 60 inches (2 to 150 cm)—olive gray gravelly silt loam
Depth class: very deep
Drainage class: well drained
Permeability: moderately slow
Available water capacity: high
Runoff: rapid
Depth to water table: greater than 72 inches (183 cm)
Hazard of erosion: by water—severe; by wind—severe
Root-restricting feature: firm glacial till at the surface

Included Areas

*soils on toeslopes that have a high water table
*soils that have slopes of more than 45 percent
*soils with stones and boulders on or near the surface

Major Uses

Current uses: wildlife habitat and recreation

Major Management Factors

Elevation: 50 to 1500 feet (15 to 457 m)
Climatic factors (average annual):
*precipitation—28 inches (71 cm)
*air temperature—32 °F (0 °C)
*growing degree days—1250 to 1500
Soil related factors: stones and boulders on the surface in some areas, depth to glacial till substratum, water erosion (Figure 3), wind erosion, and slope

Woodland

*The principal tree species are white spruce and paper birch.
*Among the common forest understory plants are bluejoint grass, alders, forbs, and ferns.
Estimated mean site index (100 year site curve) for white spruce on Strandline soil: 70

General management considerations:
*Since the soil is highly erodible, only those logging methods that do not disturb the organic mat should be employed. Otherwise, siltation of nearby streams may result.
*The main limitation for the harvesting of timber is steep slopes on part of the mapping unit.
*Seeding is advisable if the soil has been disturbed by logging or fire.
*Trees suitable for planting include white spruce.
Suitable management practices:
*Use conventional equipment in harvesting, but limit its use when the soil is wet.
*Reduce the risk of erosion by seeding roads, cutbanks, and landings.
*Reduce the risk of erosion by seeding cuts and fills and stabilizing cuts with a grass straw mulch.

Wildlife

This map unit provides habitat for moose, bears, porcupines, hares, and shrews.

217—Lucile silt loam, 0 to 2 percent slopes

Composition

Lucile soil and similar inclusions: 85 percent
Contrasting inclusions: 15 percent

Characteristics of the Lucile Soil

Position on the landscape: stream terraces
Slope range: 0 to 2 percent
Slope features: shape—plane to concave
Organic mat on surface: 1 to 4 inches (2 to 10 cm) thick
Native vegetation: alders, willows, bluejoint grass with scattered paper birch, and white and black spruce

Typical profile:
*0 to 1 inch (0 to 2 cm)—dark grayish brown silt loam
*1 to 4 inches (2 to 10 cm)—very dark brown silt loam
*4 to 9 inches (10 to 22 cm)—dark reddish brown silt loam
*9 to 16 inches (22 to 40 cm)—dark yellowish brown silt loam
*16 to 26 inches (40 to 66 cm)—light brownish gray silt loam
*26 to 60 inches (66 to 150 cm)—light brownish gray gravelly sand

Depth class: very deep
Drainage class: poorly drained

Permeability: in the loess mantle—moderate; in the sand and gravel—rapid
Available water capacity: moderate
Depth to sand and gravel: 15 to 30 inches (38 to 76 cm)
Runoff: slow
Depth to water table: 18 to 30 inches (45 to 76 cm)
Hazard of erosion: by water—slight; by wind—severe

Included Areas

*soils on similar landscape positions that are well drained
*soils in slightly concave positions that are mucky in the upper 5 to 15 inches (12 to 38 cm)
*soils similar to Lucile that have slopes from 2 to 20 percent
*muskegs
*soils with stones and boulders on or near the surface
*soils with a layer of sand up to 6 inches thick over the gravelly substratum

Major Uses

Current uses: wildlife habitat and recreation
Potential uses: hayland and pastureland

Major Management Factors

Elevation: 50 to 1500 feet (15 to 457 m)
Climatic factors (average annual):
*precipitation—28 inches (71 cm)
*air temperature—32 °F (0 °C)
*growing degree days—1250 to 1500
Soil related factors: stones on the surface in some areas, depth to water table, depth to sand and gravel, wind erosion, and low fertility

Hayland and Pastureland

General management considerations:
*Grasses grow well if they are adequately fertilized.
*Suitable species for planting are adapted grasses such as creeping foxtail.
*Wetness limits the choice of plants.
*Stones and boulders on or near the surface of the soil in some areas may limit field operations.

Suitable management practices:
*Seed only hay and pasture plants that tolerate seasonal wetness.
*Maintain or improve fertility by using conservation tillage and fertilizing and liming according to soil test results.
*Keep pasture and hayland in permanent pasture or native plant cover.

Wildlife

This map unit provides habitat for moose, bears, porcupines, hares, coyotes, small rodents, and spruce grouse.

218—Nancy-Kashwitna complex, 0 to 2 percent slopes

Composition

Nancy soil and similar inclusions: 50 percent
Kashwitna soil and similar inclusions: 35 percent
Contrasting inclusions: 15 percent

Characteristics of the Nancy Soil

Position on the landscape: alluvial terraces
Slope range: 0 to 2 percent
Slope features: shape—plane to convex
Organic mat on surface: 1 to 5 inches (2 to 12 cm) thick
Native vegetation: white spruce, paper birch, grasses, and forbs

Typical profile:
*0 to 3 inches (0 to 7 cm)—very dark grayish brown silt loam
*3 to 4 inches (7 to 10 cm)—grayish brown silt loam
*4 to 13 inches (10 to 33 cm)—dark brown and brown silt loam
*13 to 20 inches (33 to 50 cm)—dark reddish brown silt loam
*20 to 24 inches (50 to 60 cm)—dark yellowish brown silt loam
*24 to 60 inches (60 to 150 cm)—variegated very gravelly sand

Depth class: very deep
Drainage class: well drained
Permeability: in the loess mantle—moderate; in the sand and gravel—rapid
Available water capacity: moderate
Depth to sand and gravel: 20 to 30 inches (50 to 76 cm)
Runoff: slow
Depth to water table: greater than 72 inches (183 cm)
Hazard of erosion: by water—slight; by wind—severe

Characteristics of the Kashwitna Soil

Position on the landscape: alluvial terraces
Slope range: 0 to 2 percent
Slope features: shape—plane to convex
Organic mat on surface: 2 to 5 inches (5 to 12 cm) thick
Native vegetation: white spruce, paper birch, grasses, and forbs

Typical profile:
*0 to 2 inches (0 to 5 cm)—gray silt loam
*2 to 7 inches (5 to 17 cm)—dark reddish brown and strong brown silt loam
*7 to 9 inches (17 to 22 cm)—very dark grayish brown silt loam
*9 to 18 inches (22 to 45 cm)—dark brown and dark yellowish brown silt loam
*18 to 60 inches (45 to 150 cm)—olive brown very gravelly sand

Depth class: very deep
Drainage class: well drained
Permeability: in the loess mantle—moderate; in the sand and gravel—rapid
Available water capacity: moderate
Depth to the sand and gravel: 10 to 20 inches (25 to 50 cm)
Runoff: slow
Depth to water table: greater than 72 inches (183 cm)
Hazard of erosion: by water—slight; by wind—severe

Included Areas

*Muskegs
*Mineral soils in slight depressional areas that are poorly drained
*Soils in old stream channels that are sandy and gravelly throughout the profile
*Soils with stones and boulders on or near the surface

Major Uses

Current uses: wildlife habitat and recreation
Potential uses: hayland, pastureland, rural homesites, and woodland

Major Management Factors

Elevation: 50 to 1000 feet (15 to 304 cm)
Climatic factors (average annual):
*precipitation—28 inches (71 cm)
*air temperature—32 °F (0 °C)
*growing degree days—1250 to 1500
Soil related factors: available water capacity, depth to sand and gravel, wind erosion, frost heaving, hazard of seepage, and low fertility

Hayland and Pastureland

General management considerations:
*Most climatically adapted crops and grasses can be grown if adequately fertilized and limed according to soil test results.
*Suitable species for planting are adapted grasses, small grains, and hardy, cool- season vegetables such as potatoes.
*Stones and boulders on or near the surface in some areas may limit field operations.

Suitable management practices:
*Conserve moisture by planting field windbreaks and using conservation tillage.
*Maintain or improve fertility by fertilizing and liming according to soil test results.
*Reduce the risk of water erosion by maintaining crop residue.
*Reduce the risk of wind erosion by maintaining crop residue on the surface, leaving windbreaks as clearing is done or planting field windbreaks, and using conservation tillage.
*Keep pasture and hayland in permanent adapted or native plant cover.

Woodland

*The principal tree species are white spruce and paper birch.
*Among the common forest understory plants are bluejoint grass, ferns, highbush cranberry, and dwarf dogwood.

Estimated mean site index (100 year site curve) for white spruce on Nancy soil: 76
Estimated mean site index (100 year site curve) for white spruce on Kashwitna soil: 69

General management considerations:
*Since the soil is highly susceptible to soil blowing, only those logging methods that do not disturb the organic mat should be employed. Otherwise, siltation of nearby streams may result.

Suitable management practices:
*Use conventional equipment in harvesting, but limit its use when the soil is wet.
*Reduce the risk of soil blowing by seeding roads, cutbanks, and landings, and avoiding excessive disturbance on the soil surface.

Building Site Development

General management considerations:
*Excavation can expose soil material that is highly susceptible to soil blowing.
*Frost action limits construction of access roads, driveways, and buildings.
*The risk of seepage and the hazard of polluting the water supply limit the use of this unit for a conventional sewage treatment system.
*The rapid permeability of the substratum may allow effluent from moderate or high density housing to pollute the water table.

Suitable management practices:
*Reduce the risk of erosion by stabilizing areas that have been disturbed.
*Consider the depth to which frost penetrates in designing footings and road bases.

Wildlife

This map unit provides habitat for moose, bears, porcupines, hares, coyotes, small rodents, and spruce grouse.

NOTE: In the central Susitna Valley, some delineations of this unit may occur over sand rather than sand and gravel.

219—Nancy-Kashwitna complex, 2 to 7 percent slopes

Composition

Nancy soil and similar inclusions: 50 percent
Kashwitna soil and similar inclusions: 35 percent
Contrasting inclusions: 15 percent

Characteristics of the Nancy Soil

Position on landscape: alluvial terraces
Slope range: 2 to 7 percent
Slope features: shape—plane to convex
Organic mat on surface: 1 to 5 inches (2 to 12 cm) thick
Native vegetation: white spruce, paper birch, grasses, and forbs
Typical profile:
*0 to 3 inches (0 to 7 cm)—very dark grayish brown silt loam
*3 to 4 inches (7 to 10 cm)—grayish brown silt loam
*4 to 13 inches (10 to 33 cm)—dark brown and brown silt loam
*13 to 20 inches (33 to 50 cm)—dark reddish brown silt loam
*20 to 24 inches (50 to 60 cm)—dark yellowish brown silt loam
*24 to 60 inches (60 to 150 cm)—variegated very gravelly sand
Depth class: very deep
Drainage class: well drained
Permeability: in the loess mantle—moderate; in the sand and gravel—rapid
Available water capacity: moderate
Depth to the sand and gravel: 20 to 30 inches (50 to 76 cm)
Runoff: slow to medium
Depth to water table: greater than 72 inches (183 cm)
Hazard of erosion: by water—moderate; by wind—severe

Characteristics of the Kashwitna Soil

Position on the landscape: alluvial terraces
Slope range: 2 to 7 percent
Slope features: shape—plane to convex
Organic mat on surface: 2 to 5 inches (5 to 12 cm) thick
Native vegetation: white spruce, paper birch, grasses, and forbs

Typical profile:
*0 to 2 inches (0 to 5 cm)—gray silt loam
*2 to 7 inches (5 to 17 cm)—dark reddish brown and strong brown silt loam
*7 to 9 inches (17 to 22 cm)—very dark grayish brown silt loam
*9 to 18 inches (22 to 45 cm)—dark brown and dark yellowish brown silt loam
*18 to 60 inches (45 to 150 cm)—olive brown very gravelly sand

Depth class: very deep
Drainage class: well drained
Permeability: in the loess mantle—moderate; in the sand and gravel—rapid
Available water capacity: moderate
Depth to sand and gravel: 10 to 20 inches (25 to 50 cm)
Runoff: slow to medium
Depth to water table: greater than 72 inches (183 cm)
Hazard of erosion: by water—moderate; by wind—severe

Included Areas

*muskegs
*poorly drained mineral soils in slight depressional

areas and on footslopes
*soils in old stream channels that are sandy and gravelly throughout the profile
*soils with stones and boulders on or near the surface

Major Uses

Current uses: wildlife habitat and recreation
Potential uses: hayland, pastureland, woodland, and rural homesites

Major Management Factors

Elevation: 50 to 1000 feet (15 to 304 m)
Climatic factors (average annual):
*precipitation—28 inches (71 cm)
*air temperature—32 °F (0 °C)
*growing degree days—1250 to 1500
Soil related factors: available water capacity, depth to the sand and gravel, water erosion, wind erosion, frost heaving, hazard of seepage, and low fertility

Hayland and Pastureland

General management considerations:
*Most climatically adapted grasses can be grown if adequately fertilized and limed according to soil test results.
*Suitable species for planting are adapted grasses and hardy, cool-season vegetables such as potatoes.
*Stones and boulders on or near the surface in some areas may limit field operations.

Suitable management practices:
*Conserve moisture by planting field windbreaks and using conservation tillage.
*Maintain or improve fertility by fertilizing and liming according to soil test results.
*Reduce the risk of water erosion by maintaining crop residue.
*Reduce the risk of wind erosion by maintaining crop residue, leaving windbreaks as clearing is done or planting field windbreaks, and using conservation tillage.
*Keep pasture and hayland in permanent adapted or native plant cover.

Woodland

*The principal tree species are white and paper birch.
*Among the common forest understory plants are bluejoint grass, ferns, highbush cranberry, and dwarf dogwood.
Estimated mean site index (100 year site curve) for white spruce on Nancy soil: 76
Estimated mean site index (100 year site curve) for white spruce on Kashwitna soil: 69
General management considerations:
*Since the soil is highly susceptible to soil blowing, only those logging methods that do not disturb the organic mat should be employed. Otherwise, siltation of nearby streams may result.

Suitable management practices:
*Use conventional equipment in harvesting, but limit its use when the soil is wet.
*Reduce the risk of soil blowing by seeding roads, cutbanks, and landings, and avoiding excessive disturbance on the soil surface.

Building Site Development

General management considerations:
*Excavation can expose soil material that is highly susceptible to wind and water erosion.
*Frost action limits construction of access roads, driveways, and buildings.
*The risk of seepage and the hazard of polluting the water supply limit the use of this unit for a conventional sewage treatment system.
*The rapid permeability of the substratum may allow effluent from moderate or high density housing to pollute the water table.

Suitable management practices:
*Reduce the risk of erosion and the maintenance cost by stabilizing areas that have been disturbed.
*Consider the depth to which frost penetrates in designing footings and road bases.

Wildlife

This map unit provides habitat for moose, bears, porcupines, hares, small rodents, coyotes, and spruce grouse.

NOTE: In the central Susitna Valley, some delineations of this unit may occur over sand rather than sand and gravel.

220—Nancy-Kashwitna complex, 7 to 12 percent slopes

Composition

Nancy soil and similar inclusions: 45 percent
Kashwitna soil and similar inclusions: 40 percent

Contrasting inclusions: 15 percent

Characteristics of the Nancy Soil

Position on landscape: alluvial terraces
Slope range: 7 to 12 percent
Slope features: shape—plane to convex
Organic mat on surface: 1 to 5 inches (2 to 12 cm) thick
Native vegetation: white spruce, paper birch, grasses, and forbs

Typical profile:
*0 to 3 inches (0 to 7 cm)—very dark grayish brown silt loam
*3 to 4 inches (7 to 10 cm)—grayish brown silt loam
*4 to 13 inches (10 to 33 cm)—dark brown and brown silt loam
*13 to 20 inches (33 to 50 cm)—dark reddish brown silt loam
*20 to 24 inches (50 to 60 cm)—dark yellowish brown silt loam
*24 to 60 inches (60 to 150 cm)—variegated very gravelly sand

Depth class: very deep
Drainage class: well drained
Permeability: in the loess mantle—moderate; in the sand and gravel—rapid
Available water capacity: moderate
Depth to the sand and gravel: 20 to 30 inches (50 to 76 cm)
Runoff: slow to medium
Depth to water table: greater than 72 inches (183 cm)
Hazard of erosion: by water—severe; by wind—severe

Characteristics of the Kashwitna Soil

Position on the landscape: alluvial terraces
Slope range: 7 to 12 percent
Slope features: shape—convex
Organic mat on surface: 2 to 5 inches (5 to 12 cm) thick
Native vegetation: white spruce, paper birch, grasses, and forbs

Typical profile:
*0 to 2 inches (0 to 5 cm)—gray silt loam
*2 to 7 inches (5 to 17 cm)—dark reddish brown and strong brown silt loam
*7 to 9 inches (17 to 22 cm)—very dark grayish brown silt loam
*9 to 18 inches (22 to 45 cm)—dark brown and dark yellowish brown silt loam
*18 to 60 inches (45 to 150 cm)—olive brown very gravelly sand

Depth class: very deep
Drainage class: well drained
Permeability: in the loess mantle—moderate; in the sand and gravel—rapid

Available water capacity: moderate
Depth to sand and gravel: 10 to 20 inches (25 to 50 cm)
Runoff: slow to medium
Depth to water table: greater than 72 inches (183 cm)
Hazard of erosion: by water—severe; by wind—severe

Included Areas

*muskegs
*poorly drained mineral soils on footslopes
*soils on short, steep terrace breaks
*soils with stones and boulders on or near the surface

Major Uses

Current uses: wildlife habitat and recreation
Potential uses: hayland, pastureland, woodland, and rural homesites

Major Management Factors

Elevation: 50 to 1000 feet (15 to 304 m)
Climatic factors (average annual):
*precipitation—28 inches (71 cm)
*air temperature—32 °F (0 °C)
*growing degree days—1250 to 1500
Soil related factors: depth to sand and gravel, water erosion, wind erosion, frost heaving, hazard of seepage, slope, and low fertility

Hayland and Pastureland

General management considerations:
*Most climatically adapted grasses can be grown if adequately fertilized and limed according to soil test results.

*Suitable species for planting are adapted grasses such as brome, timothy, and fescue.
*Stones and boulders on or near the surface in some areas may limit field operations.

Suitable management practices:

*Maintain or improve fertility by fertilizing and liming according to soil test results.
*Reduce the risk of water erosion by tilling on the contour or across the slope.
*Keep pasture and hayland in permanent adapted or native plant cover.
*Windbreaks should be left as clearing is done.

Woodland

*The principal tree species are white and paper birch.
*Among the common forest understory plants are bluejoint grass, ferns, highbush cranberry, and dwarf dogwood.

Estimated mean site index (100 year site curve) for white spruce on Nancy soil: 76
Estimated mean site index (100 year site curve) for white spruce on Kashwitna soil: 69

General management considerations:
*Since the soil is highly susceptible to soil blowing, only those logging methods that do not disturb the organic mat should be employed. Otherwise, siltation of nearby streams may result.

Suitable management practices:
*Use conventional equipment in harvesting, but limit its use when the soil is wet.
*Reduce the risk of soil blowing by seeding roads, cutbanks, and landings, and avoiding excessive disturbance on the soil surface.

Building Site Development

General management considerations:
*Excavation can expose soil material that is highly susceptible to wind and water erosion.
*Frost action limits construction of access roads, driveways, and buildings.
*The risk of seepage and the hazard of polluting the water supply limit the use of this unit for a conventional sewage treatment system.
*The rapid permeability of the substratum may allow effluent from moderate or high density housing to pollute the water table.

Suitable management practices:
*Reduce the risk of erosion and the maintenance cost by stabilizing areas that have been disturbed.
*Consider the depth to which frost penetrates in designing footings and road bases.

Wildlife

This map unit provides habitat for moose, bears, porcupines, hares, small rodents, coyotes, and spruce grouse.

NOTE: In the central Susitna Valley, some delineations of this unit may occur over sand rather than sand and gravel.

221—Nancy-Kashwitna complex, 12 to 20 percent slopes

Composition

Nancy soil and similar inclusions: 45 percent
Kashwitna soil and similar inclusions: 40 percent
Contrasting inclusions: 15 percent

Characteristics of the Nancy Soil

Position on landscape: alluvial terraces
Slope range: 12 to 20 percent
Slope features: shape—plane to convex
Organic mat on surface: 1 to 5 inches (2 to 12 cm) thick
Native vegetation: white spruce, paper birch, grasses, and forbs

Typical profile:
*0 to 3 inches (0 to 7 cm)—very dark grayish brown silt loam
*3 to 4 inches (7 to 10 cm)—grayish brown silt loam
*4 to 13 inches (10 to 33 cm)—dark brown and brown silt loam
*13 to 20 inches (33 to 50 cm)—dark reddish brown silt loam
*20 to 24 inches (50 to 60 cm)—dark yellowish brown silt loam
*24 to 60 inches (60 to 150 cm)—variegated very gravelly sand

Depth class: very deep
Drainage class: well drained
Permeability: in the loess mantle—moderate; in the sand and gravel—rapid
Available water capacity: moderate
Depth to the sand and gravel: 20 to 30 inches (50 to 76 cm)
Runoff: medium to rapid
Depth to water table: greater than 72 inches (183 cm)
Hazard of erosion: by water—severe; by wind—severe

Characteristics of the Kashwitna Soil

Position on the landscape: alluvial terraces
Slope range: 12 to 20 percent
Slope features: shape—convex
Organic mat on surface: 2 to 5 inches (5 to 12 cm) thick
Native vegetation: white spruce, paper birch, grasses, and forbs

Typical profile:
*0 to 2 inches (0 to 5 cm)—gray silt loam
*2 to 7 inches (5 to 17 cm)—dark reddish brown and strong brown silt loam
*7 to 9 inches (17 to 22 cm)—very dark grayish brown silt loam
*9 to 18 inches (22 to 45 cm)—dark brown and dark yellowish brown silt loam
*18 to 60 inches (45 to 150 cm)—olive brown very gravelly sand

Depth class: very deep
Drainage class: well drained
Permeability: in the loess mantle—moderate; in the sand and gravel—rapid
Available water capacity: moderate
Depth to sand and gravel: 10 to 20 inches (25 to 50 cm)
Runoff: medium to rapid
Depth to water table: greater than 72 inches (183 cm)
Hazard of erosion: by water—severe; by wind—severe

Included Areas

*muskegs
*mineral soils on short, steep terrace breaks
*soils on footslopes that are poorly drained
*soils with stones and boulders on or near the surface

Major Uses

Current uses: wildlife habitat and recreation
Potential uses: hayland, pastureland, woodland, and rural homesites

Major Management Factors

Elevation: 50 to 1000 feet (15 to 304 m)
Climatic factors (average annual):
*precipitation—28 inches (71 cm)
*air temperature—32 °F (0 °C)
*growing degree days—1250 to 1500
Soil related factors: depth to sand and gravel, water erosion, wind erosion, frost heaving, hazard of seepage, and slope

Woodland

*The principal tree species are white and paper birch.
*Among the common forest understory plants are bluejoint grass, ferns, highbush cranberry, and dwarf dogwood.
Estimated mean site index (100 year site curve) for white spruce on Nancy soil: 76
Estimated mean site index (100 year site curve) for white spruce on Kashwitna soil: 69

General management considerations:
*Since the soil is highly susceptible to soil blowing, only those logging methods that do not disturb the organic mat should be employed. Otherwise, siltation of nearby streams may result.

Suitable management practices:
*Use conventional equipment in harvesting, but limit its use when the soil is wet.
*Reduce the risk of soil blowing by seeding roads, cutbanks, and landings, and avoiding excessive disturbance on the soil surface.

Building Site Development

General management considerations:
*Excavation can expose soil material that is highly susceptible to wind and water erosion.
*Frost action limits construction of access roads, driveways, and buildings.
*The risk of seepage and the hazard of polluting the water supply limit the use of this unit for a conventional sewage treatment system.
*The rapid permeability of the substratum may allow effluent from moderate or high density housing to pollute the water table.

Suitable management practices:
*Reduce the risk of erosion and the maintenance cost by stabilizing areas that have been disturbed.
*Consider the depth to which frost penetrates in designing footings and road bases.

Wildlife

This map unit provides habitat for moose, bears, porcupines, hares, small rodents, coyotes, and spruce grouse.

NOTE: In the central Susitna Valley, some

delineations of this unit may occur over sand rather than sand and gravel.

222—Nancy-Kashwitna complex, 20 to 30 percent slopes

Composition

Nancy soil and similar inclusions: 45 percent
Kashwitna soil and similar inclusions: 40 percent
Contrasting inclusions: 15 percent

Characteristics of the Nancy Soil

Position on landscape: alluvial terraces
Slope range: 20 to 30 percent
Slope features: shape—plane to convex
Organic mat on surface: 1 to 5 inches (2 to 12 cm) thick
Native vegetation: white spruce, paper birch, grasses, and forbs

Typical profile:
*0 to 3 inches (0 to 7 cm)—very dark grayish brown silt loam
*3 to 4 inches (7 to 10 cm)—grayish brown silt loam
*4 to 13 inches (10 to 33 cm)—dark brown and brown silt loam
*13 to 20 inches (33 to 50 cm)—dark reddish brown silt loam
*20 to 24 inches (50 to 60 cm)—dark yellowish brown silt loam
*24 to 60 inches (60 to 150 cm)—variegated very gravelly sand

Depth class: very deep
Drainage class: well drained
Permeability: in the loess mantle—moderate; in the sand and gravel—rapid
Available water capacity: moderate
Depth to the sand and gravel: 20 to 30 inches (50 to 76 cm)
Runoff: rapid
Depth to water table: greater than 72 inches (183 cm)
Hazard of erosion: by water—severe; by wind—severe

Characteristics of the Kashwitna Soil

Position on the landscape: alluvial terraces
Slope range: 20 to 30 percent
Slope features: shape—convex
Organic mat on surface: 2 to 5 inches (5 to 12 cm) thick
Native vegetation: white spruce, paper birch, grasses, and forbs

Typical profile:
*0 to 2 inches (0 to 5 cm)—gray silt loam
*2 to 7 inches (5 to 17 cm)—dark reddish brown and strong brown silt loam
*7 to 9 inches (17 to 22 cm)—very dark grayish brown silt loam
*9 to 18 inches (22 to 45 cm)—dark brown and dark yellowish brown silt loam
*18 to 60 inches (45 to 150 cm)—olive brown very gravelly sand

Depth class: very deep
Drainage class: well drained
Permeability: in the loess mantle—moderate; in the sand and gravel—rapid
Available water capacity: moderate
Depth to sand and gravel: 10 to 20 inches (25 to 50 cm)
Runoff: rapid
Depth to water table: greater than 72 inches (183 cm)
Hazard of erosion: by water—severe; by wind—severe

Included Areas

*soils on slopes less than 20 percent or greater than 30 percent
*mineral soils on footslopes that are poorly drained
*soils with stones and boulders on or near the surface

Major Uses

Current uses: wildlife habitat and recreation
Potential uses: woodland

Major Management Factors

Elevation: 50 to 1000 feet (15 to 304 m)
Climatic factors (average annual):
*precipitation—28 inches (71 cm)
*air temperature—32 °F (0 °C)
*growing degree days—1250 to 1500
Soil related factors: depth to sand and gravel, water erosion, wind erosion, and slope

Woodland

*The principal tree species are white and paper birch.
*Among the common forest understory plants are bluejoint grass, ferns, highbush cranberry, and dwarf dogwood.

Estimated mean site index (100 year site curve) for white spruce on Nancy soil: 76
Estimated mean site index (100 year site curve) for white spruce on Kashwitna soil: 69

General management considerations:
*Since the soil is highly erodible, only those logging methods that do not disturb the organic mat should be employed. Otherwise, siltation of nearby streams may result.

Suitable management practices:
*Use conventional equipment in harvesting, but limit its use when the soil is wet.
*Reduce the risk of erosion by seeding roads, cutbanks, and landings, and avoiding excessive disturbance on the soil surface.

Wildlife

This map unit provides habitat for moose, bears, porcupines, hares, small rodents, coyotes, and spruce grouse.

NOTE: In the central Susitna Valley, some delineations of this unit may occur over sand rather than sand and gravel.

223—Nancy-Kashwitna complex, 30 to 45 percent slopes

Composition

Nancy soil and similar inclusions: 45 percent
Kashwitna soil and similar inclusions: 40 percent
Contrasting inclusions: 15 percent

Characteristics of the Nancy Soil

Position on landscape: alluvial terraces
Slope range: 30 to 45 percent
Slope features: shape—plane to convex
Organic mat on surface: 1 to 5 inches (2 to 12 cm) thick
Native vegetation: white spruce, paper birch, grasses, and forbs

Typical profile:
*0 to 3 inches (0 to 7 cm)—very dark grayish brown silt loam
*3 to 4 inches (7 to 10 cm)—grayish brown silt loam
*4 to 13 inches (10 to 33 cm)—dark brown and brown silt loam
*13 to 20 inches (33 to 50 cm)—dark reddish brown silt loam
*20 to 24 inches (50 to 60 cm)—dark yellowish brown silt loam
*24 to 60 inches (60 to 150 cm)—variegated very gravelly sand

Depth class: very deep
Drainage class: well drained
Permeability: in the loess mantle—moderate; in the sand and gravel—rapid
Available water capacity: moderate
Depth to the sand and gravel: 20 to 30 inches (50 to 76 cm)
Runoff: rapid
Depth to water table: greater than 72 inches (183 cm)
Hazard of erosion: by water—severe; by wind—severe

Characteristics of the Kashwitna Soil

Position on the landscape: alluvial terraces
Slope range: 30 to 45 percent
Slope features: shape—convex
Organic mat on surface: 2 to 5 inches (5 to 12 cm) thick
Native vegetation: white spruce, paper birch, grasses, and forbs

Typical profile:
*0 to 2 inches (0 to 5 cm)—gray silt loam
*2 to 7 inches (5 to 17 cm)—dark reddish brown and strong brown silt loam
*7 to 9 inches (17 to 22 cm)—very dark grayish brown silt loam
*9 to 18 inches (22 to 45 cm)—dark brown and dark yellowish brown silt loam
*18 to 60 inches (45 to 150 cm)—olive brown very gravelly sand

Depth class: very deep
Drainage class: well drained
Permeability: in the loess mantle—moderate; in the sand and gravel—rapid
Available water capacity: moderate
Depth to sand and gravel: 10 to 20 inches (25 to 50 cm)
Runoff: slow
Depth to water table: greater than 72 inches (183 cm)
Hazard of erosion: by water—severe; by wind—severe

Included Areas

*soils on similar landscape positions that have slopes greater than 45 percent

*poorly drained mineral soils on footslopes
*areas of barren glaciofluvial material
*soils with stones and boulders on or near the surface

Major Uses

Current uses: wildlife habitat and recreation
Potential uses: woodland

Major Management Factors

Elevation: 50 to 1000 feet (15 to 304 m)
Climatic factors (average annual):
*precipitation—28 inches (71 cm)
*air temperature—32 °F (0 °C)
*growing degree days—1250 to 1500
Soil related factors: depth to sand and gravel, water erosion, wind erosion, and slope

Woodland

*The principal tree species are white and paper birch.
*Among the common forest understory plants are bluejoint grass, ferns, highbush cranberry, and dwarf dogwood.

Estimated mean site index (100 year site curve) for white spruce on Nancy soil: 76
Estimated mean site index (100 year site curve) for white spruce on Kashwitna soil: 69

General management considerations:
*Since the soil is highly erodible, only those logging methods that do not disturb the organic mat should be employed. Otherwise, siltation of nearby streams may result.

Suitable management practices:
*Use conventional equipment in harvesting, but limit its use when the soil is wet.
*Reduce the risk of erosion by seeding roads, cutbanks, and landings, and avoiding excessive disturbance on the soil surface.

Wildlife

This map unit provides habitat for bears, foxes, coyotes, wolverines, moose, and small rodents.
NOTE: In the central Susitna Valley, some delineations of this unit may occur over sand rather than sand and gravel.

224—Nancy-Kashwitna complex, cool, 0 to 7 percent slopes

Composition

Nancy soil and similar inclusions: 45 percent
Kashwitna soil and similar inclusions: 40 percent
Contrasting inclusions: 15 percent

Characteristics of the Nancy Soil

Position on landscape: alluvial terraces
Slope range: 0 to 7 percent
Slope features: shape—plane to convex (Soil surface is characterized by earth hummocks caused by frost churning of the soil.)
Organic mat on surface: 1 to 5 inches (2 to 12 cm) thick
Native vegetation: white spruce, willows, alders, and grasses

Typical profile:
*0 to 3 inches (0 to 7 cm)—very dark grayish brown silt loam
*3 to 4 inches (7 to 10 cm)—grayish brown silt loam
*4 to 13 inches (10 to 33 cm)—dark brown and brown silt loam
*13 to 20 inches (33 to 50 cm)—dark reddish brown silt loam
*20 to 24 inches (50 to 60 cm)—dark yellowish brown silt loam
*24 to 60 inches (60 to 150 cm)—variegated very gravelly sand

Depth class: very deep
Drainage class: well drained
Permeability: in the loess mantle—moderate; in the sand and gravel—rapid
Available water capacity: moderate
Depth to the sand and gravel: 20 to 30 inches (50 to 76 cm)
Runoff: slow to medium
Depth to water table: greater than 72 inches (183 cm)
Hazard of erosion: by water—moderate; by wind—severe

Characteristics of the Kashwitna Soil

Position on the landscape: alluvial terraces
Slope range: 0 to 7 percent
Slope features: shape—convex
Organic mat on surface: 2 to 5 inches (5 to 12 cm) thick

Native vegetation: white spruce, willows, alders, and grasses

Typical profile:
*0 to 2 inches (0 to 5 cm)—gray silt loam
*2 to 7 inches (5 to 17 cm)—dark reddish brown and strong brown silt loam

*7 to 9 inches (17 to 22 cm)—very dark grayish brown silt loam
*9 to 18 inches (22 to 45 cm)—dark brown and dark yellowish brown silt loam
*18 to 60 inches (45 to 150 cm)—olive brown very gravelly sand

Depth class: very deep
Drainage class: well drained
Permeability: in the loess mantle—moderate; in the sand and gravel—rapid
Available water capacity: moderate
Depth to sand and gravel: 10 to 20 inches (25 to 50 cm)
Runoff: slow to medium
Depth to water table: greater than 72 inches (183 cm)
Hazard of erosion: by water—moderate; by wind—severe

Included Areas

*muskegs
*mineral soils in slight depressional areas that are poorly drained
*soils in old stream channels that are sandy and gravelly throughout the profile
*soils with stones and boulders on or near the surface

Major Uses

Current uses: wildlife habitat and recreation
Potential uses: hayland, pastureland, and rural homesites

Major Management Factors

Elevation: 200 to 1000 feet (60 to 304 m)
Climatic factors (average annual):
*precipitation—28 inches (71 cm)
*air temperature—32 °F (0 °C)
*growing degree days—less than 900
Soil related factors: depth to sand and gravel, water erosion, wind erosion, frost heaving, hazard of seepage, low fertility, and climate

Hayland and Pastureland

General management considerations:
*Only hardy, adapted grasses can be grown. Frost can be expected anytime during the growing season and can prevent the grass crop from maturing.
*Adapted grasses should be limed and fertilized according to soil test results.
*Stones and boulders on or near the surface in some areas may limit field operations.

Suitable management practices:
*Seed only the hay and pasture plants that tolerate periodic frosts during the growing season.
*Maintain or improve fertility by fertilizing and liming according to soil test results. Reduce the risk of water erosion by seeding to a cover crop. Keep permanent pasture or native plant cover.

Woodland

*The principal tree species are white spruce and paper birch.
*Among the common forest understory plants are bluejoint grass, ferns, highbush cranberry, and dwarf dogwood.

Estimated mean site index (100 year site curve) for white spruce on Nancy soil: 76
Estimated mean site index (100 year site curve) for white spruce on Kashwitna soil: 69

General management considerations:
*Since the soil is highly susceptible to soil blowing, only those logging methods that do not disturb the organic mat should be employed. Otherwise, siltation of nearby streams may result.

Suitable management practices:
*Use conventional equipment in harvesting, but limit its use when the soil is wet.
*Reduce the risk of soil blowing by seeding roads, cutbanks, and landings, and avoiding excessive disturbance on the soil surface.

*Reduce the risk of erosion and the maintenance cost by stabilizing areas that have been disturbed.
*Consider the depth to which frost penetrates in designing footings and road bases.

Building Site Development

General management considerations:

*Excavation can expose soil material that is highly susceptible to wind and water erosion.
*Frost action limits construction of access roads, driveways, and buildings.
*The risk of seepage and the hazard of polluting the water supply limit the use of this unit for a conventional sewage treatment system.
*The rapid permeability of the substratum may allow effluent from moderate or high density housing to pollute the water table.
Suitable management practices:
*Reduce the risk of erosion and the maintenance cost by stabilizing areas that have been disturbed.
*Consider the depth to which frost penetrates in designing footings and road bases.

Wildlife

This map unit provides habitat for moose, bears, foxes, coyotes, and hares.

225—Niklason silt loam, 0 to 2 percent slopes

Composition

Niklason soil and similar inclusions: 85 percent
Contrasting inclusions: 15 percent

Characteristics of the Niklason Soil

Position on the landscape: floodplains, alluvial fans, and natural levees
Slope range: 0 to 2 percent
Slope features: shape—plane to convex
Organic mat on surface: 0 to 2 inches (0 to 5 cm)
Native vegetation: cottonwood, alders, fireweed, bluejoint grass, and forbs

Typical profile:
*0 to 4 inches (0 to 10 cm)—dark brown silt loam
*4 to 21 inches (10 to 53 cm)—brown sandy loam
*21 to 25 inches (53 to 63 cm)—light gray silt loam
*25 to 60 inches (63 to 150 cm)—variegated extremely gravelly sand

Depth class: very deep
Drainage class: well drained
Permeability: in the loamy material—moderately rapid; in the sand and gravel—rapid
Available water capacity: low
Depth to sand and gravel: 20 to 40 inches (50 to 100 cm)
Runoff: slow
Depth to water table: greater than 72 inches (183 cm)
Hazard of erosion: by water—moderate; by wind—severe
Hazard of flooding: frequent (In addition to spring and summer flooding hazard, intense freezing causes a winter flooding hazard.)

Included Areas

*riverwash
*stream channels
*soils on similar landscape positions that are somewhat poorly or poorly drained
*soils with stones or boulders on or near the surface

Major Uses

Current uses: wildlife habitat and recreation
Potential uses: hayland, pastureland, and woodland

Major Management Factors

Elevation: 25 to 1000 feet (7 to 304 m)
Climatic factors (average annual):
*precipitation—28 inches (71 cm)
*air temperature—32 °F (0 °C)
*growing degree days—1250 to 1500
Soil related factors: flooding, water erosion, wind erosion, and low fertility

Hayland and Pastureland

General management considerations:
*Most climatically adapted species can be grown if protection from flooding is provided.
*Stones and boulders on or near the surface of the soil in some areas limit field operations.
*Seasonal flooding limits the production and harvesting of crops. Grasses respond to fertilizer and lime.

Suitable management practices:
*Seed only the hay and pasture plants and crops that tolerate periodic inundation, such as creeping foxtail.
*Maintain or improve fertility by fertilizing and liming according to soil test results.
*Keep ground in permanent cover or native cover.

Woodland

*The principal tree species are white spruce, paper birch, and balsam poplar.

*Among the common forest understory plants are alder, devils club, bluejoint grass, and highbush cranberry.

Estimated mean site index (100 year site curve) for white spruce on Nikalson soil: 72

General management considerations:
*Since the soil is highly erodible, only those logging methods that do not disturb the organic mat should be employed. Otherwise, siltation of nearby streams may result.
*The main limitation for the harvesting of timber is frequent flooding during the growing season.
*Seeding is advisable if the soil has been disturbed by logging or fire.
*Mortality of seedlings may be high in areas that are subject to flooding.
*Trees suitable for planting include white spruce.

Suitable management practices:
*Use conventional equipment in harvesting, but limit its use when the soil is wet.
*Reduce the risk of erosion by seeding roads, cutbanks, and landings, and avoiding excessive disturbance on the soil surface.

Wildlife

This map unit provides habitat for moose, bears, coyotes, small rodents, hawks, and owls.

226—Puntilla silt loam, 7 to 20 percent slopes

Composition

Puntilla soil and similar inclusions: 85 percent
Contrasting inclusions: 15 percent

Characteristics of the Puntilla Soil

Position on the landscape: mountain side slopes
Slope range: 7 to 20 percent
Slope features: shape—convex

Organic mat on surface: 1 to 6 inches (2 to 15 cm) thick
Native vegetation: bluejoint grass, alders, ferns, and forbs
Typical profile:
*0 to 4 inches (0 to 10 cm)—black silt loam
*4 to 6 inches (10 to 15 cm)—dark gray silt loam
*6 to 10 inches (15 to 22 cm)—very dark brown silt loam
*10 to 17 inches (22 to 43 cm)—yellowish red silt loam
*17 to 21 inches (43 to 53 cm)—yellowish brown loam
*21 to 26 inches (53 to 66 cm)—pale brown loam
*26 to 36 inches (66 to 91 cm)—very dark grayish brown and dark grayish brown silt loam
*36 to 60 inches (91 to 150 cm)—olive gray gravelly loam

Depth class: very deep
Drainage class: well drained
Permeability: in the loess mantle—moderate; in the glacial till substratum—moderately slow
Available water capacity: very high
Runoff: medium to rapid
Depth to water table: greater than 72 inches (183 cm)
Hazard of erosion: by water—moderate to severe; by wind—severe
Depth to firm glacial till substratum: 14 to 38 inches (35 to 96 cm)

Included Areas

*muskegs
*mineral soils on similar landscape positions that are poorly and very poorly drained
*soils with stones and boulders on or near the surface

Major Uses

Current uses: wildlife habitat and recreation
Potential uses: rangeland

Major Management Factors

Elevation: 600 to 2000 feet (182 to 609 m)
Climatic factors (average annual):
*precipitation—28 inches (71 cm)
*air temperature—31 °F (-.5 °C) estimated
*growing degree days—less than 1250
Soil related factors: depth to glacial till substratum, water erosion, wind erosion, frost heaving and slope, and stone and boulder size erratics on or near the surface in some areas

Wildlife

This map unit provides habitat for moose, bears, coyotes, shrews, voles, and ptarmigan.

227—Puntilla silt loam, 20 to 30 percent slopes

Composition

Puntilla soil and similar inclusions: 90 percent
Contrasting inclusions: 10 percent

Characteristics of the Puntilla Soil

Position on the landscape: mountain side slopes
Slope range: 20 to 30 percent
Slope features: shape—convex
Organic mat on surface: 1 to 6 inches (2 to 15 cm) thick
Native vegetation: bluejoint grass, alders, ferns, and forbs

Typical profile:
*0 to 4 inches (0 to 10 cm)—black silt loam
*4 to 6 inches (10 to 15 cm)—dark gray silt loam
*6 to 10 inches (15 to 22 cm)—very dark brown silt loam
*10 to 17 inches (22 to 43 cm)—yellowish red silt loam
*17 to 21 inches (43 to 53 cm)—yellowish brown loam
*21 to 26 inches (53 to 66 cm)—pale brown loam
*26 to 36 inches (66 to 91 cm)—very dark grayish brown and dark grayish brown silt loam
*36 to 60 inches (91 to 150 cm)—olive gray gravelly loam

Depth class: very deep
Drainage class: well drained
Permeability: in the loess mantle—moderate; in the glacial till substratum—moderately slow
Available water capacity: very high
Runoff: rapid
Depth to water table: greater than 72 inches (183 cm)
Hazard of erosion: by water—severe; by wind—severe
Depth to firm glacial till substratum: 14 to 38 inches (35 to 96 cm)

Included Areas

*muskegs
*mineral soils on similar landscape positions that are poorly and very poorly drained
*soils with stones and boulders on or near the surface

Major Uses

Current uses: wildlife habitat and recreation
Potential uses: rangeland

Major Management Factors

Elevation: 600 to 2000 feet (182 to 609 m)
Climatic factors (average annual):
*precipitation—28 inches (71 cm)
*air temperature—31 °F (-.5 °C) estimated
*growing degree days—less than 1250
Soil related factors: depth to glacial till substratum, water erosion, wind erosion, slope, and stone and boulder size erratics on or at the surface in some areas.

Wildlife

This map unit provides habitat for moose, bears, coyotes, shrews, voles, and ptarmigan.

228—Puntilla silt loam, 30 to 45 percent slopes

Composition

Puntilla soil and similar inclusions: 90 percent
Contrasting inclusions: 10 percent

Characteristics of the Puntilla Soil

Position on the landscape: mountain side slopes
Slope range: 30 to 45 percent
Slope features: shape—convex
Organic mat on surface: 1 to 6 inches (2 to 15 cm) thick
Native vegetation: bluejoint grass, alders, ferns, and forbs

Typical profile:
*0 to 4 inches (0 to 10 cm)—black silt loam
*4 to 6 inches (10 to 15 cm)—dark gray silt loam
*6 to 10 inches (15 to 22 cm)—very dark brown silt loam
*10 to 17 inches (22 to 43 cm)—yellowish red silt loam
*17 to 21 inches (43 to 53 cm)—yellowish brown loam
*21 to 26 inches (53 to 66 cm)—pale brown loam
*26 to 36 inches (66 to 91 cm)—very dark grayish brown and dark grayish brown silt loam
*36 to 60 inches (91 to 150 cm)—olive gray gravelly loam

Depth class: very deep
Drainage class: well drained
Permeability: in the loess mantle—moderate; in the

glacial till substratum—moderately slow
Available water capacity: very high
Runoff: rapid
Depth to water table: greater than 72 inches (183 cm)
Hazard of erosion: by water—severe; by wind—severe
Depth to firm glacial till substratum: 14 to 38 inches (35 to 96 cm)

Included Areas

*mineral soils on similar landscape positions that are poorly and very poorly drained
*soils with stones and boulders on or near the surface

Major Uses

Current uses: wildlife habitat and recreation

Major Management Factors

Elevation: 600 to 2000 feet (182 to 609 m)
Climatic factors (average annual):
*precipitation—28 inches (71 cm)
*air temperature—31 °F (-.5 °C) estimated
*growing degree days—less than 1250 estimated
Soil related factors: slope, depth to glacial till substratum, water erosion and wind erosion, and stone and boulder size erratics on or near the surface in some areas.

Wildlife

This map unit provides habitat for moose, bears, coyotes, shrews, voles, and ptarmigan.

229—Riverwash

Position on the landscape: This map unit consists of frequently flooded, unsorted sandy, gravelly, and cobbly alluvial sediments on floodplains of rivers. The configuration and location of these sediments in the floodplains are affected by flooding and can be expected to change. In addition to spring and summer flooding hazard, intense freezing causes a winter flooding hazard. This map unit usually is barren, but some areas may have sparse growth of willows, alders, or fireweed.

230—Rubble Land

Position on landscape: This map unit consists of barren areas of loose boulders and stones. The map unit occurs on convex mountain ridges and sides slopes. On the less sloping portions of the map unit, small areas of the shallow Nakochna soils occurs. Elevation ranges from 1000 to 4300 feet (304 to 1310 m)

231—Salamatof peat, 0 to 2 percent slopes

Composition

Salamatof soil and similar inclusions: 90 percent
Contrasting inclusions: 10 percent

Characteristics of the Salamatof Soil

Position on the landscape: muskegs
Slope range: 0 to 2 percent
Slope features: shape—concave
Native vegetation: sphagnum moss, sedges, bog birch, ericaceous shrubs, and other mosses

Typical profile:
*0 to 18 inches (0 to 45 cm)—reddish brown and dark reddish brown sphagnum peat
*18 to 41 inches (45 to 1-4 cm)—dark reddish brown decomposing peat; about 75 percent fibers
*41 to 65 inches (104 to 165 cm)—dark reddish brown coarse and moderately decomposed peat; about 25 to 50 percent fibers

Depth class: very deep
Drainage class: very poorly drained
Permeability: rapid
Available water capacity: very high
Runoff: ponded to very slow
Depth to water table: +12 to 6 inches (+30 to 15 cm)

Included Areas

Contrasting inclusions:
*open water areas - these vary in size from small ponded areas to water bodies several acres in size
*mineral soils on similar landscape positions

Major Uses

Current uses: wildlife habitat and recreation

Major Management Factors

Elevation: 50 to 1200 feet (15 to 365 m)
Climatic factors (average annual):

*precipitation—28 inches (71 cm)
*air temperature—32 °F (0 °C)
*growing degree days—1250 to 1500
Soil related factors: depth to water table and inadequate drainage outlets

Wildlife

This map unit provides habitat for moose, bears, hawks, and voles.

232—Schrock silt loam, 0 to 2 percent slopes

Composition

Schrock soil and similar inclusions: 90 percent
Contrasting inclusions: 10 percent

Characteristics of the Schrock Soil

Position on the landscape: stream terraces
Slope range: 0 to 2 percent
Slope features: shape—plane to convex
Organic mat on surface: 1 to 4 inches (2 to 10 cm) thick
Native vegetation: white spruce, balsam poplar, paper birch, and bluejoint grass

Typical profile:
*0 to 2 inches (0 to 5 cm)—gray silt loam
*2 to 9 inches (5 to 22 cm)—dark brown silt loam
*9 to 11 inches (22 to 27 cm)—gray silt loam
*11 to 21 inches (27 to 53 cm)—strong brown and brown silt loam
*21 to 29 inches (53 to 73 cm)—dark brown very fine sandy loam
*29 to 36 inches (73 to 91 cm)—black loamy fine sand
*36 to 43 inches (91 to 109 cm)—black silt loam
*43 to 60 inches (109 to 150 cm)—black very cobbly fine sandy loam and silt loam
Depth class: very deep
Drainage class: well drained
Permeability: in the loess mantle—moderate; in the gravelly substratum—rapid
Available water capacity: high
Depth to gravel substratum: 14 to 28 inches (36 to 71 cm)
Runoff: slow
Depth to water table: greater than 72 inches (183 cm)
Hazard of erosion: by water—slight; by wind—severe
Flooding: rare

Included Areas

Contrasting inclusions:
*soils on slightly lower landscape positions and old stream channels that are somewhat poorly to poorly drained
*soils on similar landscape positions that are gravelly throughout the profile
*streams
*soils with stones and boulders on or near the surface

Major Uses

Current uses: wildlife habitat, recreation, and woodland
Potential uses: hayland and pastureland

Major Management Factors

Elevation: 50 to 500 feet (15 to 152 m)
Climatic factors (average annual):
*precipitation—28 inches (71 cm)
*air temperature—32 °F (0 °C)
*growing degree days—1250 to 1500
Soil related factors: wind erosion, flooding, and low fertility

Hayland and Pastureland

General management considerations:
*Most climatically adapted crops can be grown if protection from flooding is provided.
*Crops and grasses respond to fertilizer and lime.
*Suitable species for planting are adapted grasses, small grains, and hardy, cool-season vegetables such as potatoes.
*Stones and boulders on or near the surface in some areas may limit field operations.

Suitable management practices:
*Seed only the hay, pasture plants, and crops that tolerate rare flooding.
*Maintain or improve fertility by using conservation tillage and fertilizing and liming according to soil test results.
*Reduce the risk of wind erosion by maintaining crop residue on the surface, using conservation tillage, and keeping mulch on the surface.
*Windbreaks are needed to limit soil losses, maintain optimum crop yields, protect farm and ranch buildings, and provide cover for wildlife.
*When clearing, strips of trees should be left as windbreaks.
*Keep pastureland and hayland in permanent cover of adapted or native species.

Woodland

*The principal tree species are white spruce, balsam poplar, and paper birch.
*Among the common forest understory plants are bluejoint grass, bunchberry, highbush cranberry, twisted stalk, and raspberry.

Mean site index (100 year site curve) for white spruce on Schrock soil: 63

General management considerations:
*The main limitation for the harvesting of timber is rare flooding which may interfere with harvest operations.
*Rare flooding may interfere with field operations.
*Seeding is advisable if the soil has been disturbed by logging or fire.
*Mortality of seedlings may be high in areas that are subject to flooding.
*Trees suitable for planting include white spruce.

Suitable management practices:
*Use conventional equipment in harvesting, but limit its use when the soil is wet.
*Reduce the risk of erosion by seeding roads, cutbanks, and landings, seeding cuts and fills, and avoiding excessive disturbance on the soil surface.
*Improve stands by thinning before trees reach commercial size and by selective cutting of mature trees.

Wildlife

This map unit provides habitat for moose, bears, foxes, coyotes, hares, and eagles.

233—Slikok muck, 0 to 5 percent slopes

Composition

Slikok soil and similar inclusions: 90 percent
Contrasting inclusions: 10 percent

Characteristics of the Slikok Soil

Position on the landscape: toeslopes of moraines, muskeg borders, and depressional areas
Slope range: 0 to 5 percent
Slope features: shape—concave
Organic mat on surface: 5 to 15 inches (12 to 38 cm) thick
Native vegetation: black spruce, paper birch, bluejoint grass, horsetail, and willows

Typical profile:
*0 to 41 inches (0 to 104 cm)—dark yellowish brown to very dark brown mucky silt loam
*41 to 60 inches (104 to 150 cm)—grayish brown gravelly silt loam

Depth class: very deep
Drainage class: very poorly drained
Permeability: in the upper part—moderate; in the glacial till substratum—slow
Available water capacity: very high
Depth to firm glacial till substratum: 40 to 60 inches (100 to 150 cm)
Runoff: ponded to slow
Depth to water table: +12 to 12 inches (+30 to 30 cm)
Hazard of erosion: by water—slight to moderate; by wind—slight

Included Areas

Contrasting inclusions:
*mineral soils on slightly higher landscape positions
*muskegs and small lakes

Major Uses

Current uses: wildlife habitat and recreation

Major Management Factors

Elevation: 50 to 1500 feet (15 to 457 m)
Climatic factors (average annual):
*precipitation—28 inches (71 cm)
*air temperature—32 °F (0 °C)
*growing degree days—1250 to 1500
Soil related factors: depth to water table and inadequate drainage outlets

Wildlife

This map unit provides habitat for porcupines, moose, bears, and small rodents.

234—Slikok-Starichkof-Strandline complex, 0 to 7 percent slopes

Composition

Slikok soil and similar inclusions: 30 percent
Starichkof soil and similar inclusions: 30 percent
Strandline soil and similar inclusions: 25 percent
Contrasting inclusions: 15 percent

Characteristics of the Slikok Soil

Position on the landscape: footslopes of moraines and muskeg borders
Slope range: 0 to 5 percent
Slope features: shape—concave
Organic mat on surface: 5 to 15 inches (12 to 38 cm) thick
Native vegetation: black spruce, paper birch, bluejoint grass, horsetail, and willows

Typical profile:
*0 to 41 inches (0 to 104 cm)—dark yellowish brown to very dark brown mucky silt loam
*41 to 60 inches (104 to 150 cm)—grayish brown gravelly silt loam

Depth class: very deep
Drainage class: very poorly drained
Permeability: in the upper part—moderate; in the glacial till substratum—slow
Available water capacity: high
Depth to firm glacial till substratum: 40 to 60 inches (100 to 150 cm)
Runoff: slow to medium
Depth to water table: +12 to 12 inches (+30 to 30 cm)
Hazard of erosion: by water—slight to moderate; by wind—slight

Characteristics of the Starichkof Soil

Position on the landscape: muskegs
Slope range: 0 to 2 percent
Slope features: shape—plane to concave
Organic mat on surface: 5 to 15 inches (12 to 38 cm) thick
Native vegetation: sphagnum moss, sedges, ericaceous shrubs, scattered black spruce, and willows

Typical profile:
*0 to 27 inches (0 to 68 cm)—dark brown peat
*27 to 30 inches (68 to 76 cm)—grayish brown fine sandy loam
*30 to 40 inches (76 to 100 cm)—dark brown peat
*40 to 41 inches (100 to 104 cm)—grayish brown silt loam
*41 to 63 inches (104 to 160 cm)—dark brown peat

Depth class: very deep
Drainage class: very poorly drained
Permeability: rapid
Available water capacity: very high
Runoff: ponded
Depth to water table: +12 to 6 inches (+30 to 15 cm)

Characteristics of the Strandline Soil

Position on the landscape: moraines and mountain footslopes
Slope range: 2 to 7 percent
Slope features: shape—concave
Organic mat on surface: 1 to 4 inches (2 to 10 cm) thick
Native vegetation: white spruce, paper birch, bluejoint grass, ferns, alders, and forbs

Typical profile:
*0 to 2 inches (0 to 5 cm)—dark reddish brown silt loam
*2 to 5 inches (50 to 12 cm)—gray silt loam
*5 to 8 inches (12 to 20 cm)—dark reddish brown silt loam
*8 to 15 inches (20 to 38 cm)—dark brown silt loam
*15 to 20 inches (38 to 50 cm)—dark yellowish brown and brownish yellow silt loam
*20 to 22 inches (50 to 55 cm)—gray silt loam
*22 to 26 inches (55 to 66 cm)—dark yellowish brown silt loam
*26 to 31 inches (66 to 78 cm)—dark grayish brown silt loam
*31 to 60 inches (78 to 150 cm)—olive gray gravelly silt loam

Depth class: very deep
Drainage class: well drained
Permeability: in the loess mantle—moderate; in the glacial till substratum—moderately slow
Available water capacity: very high
Depth to firm glacial till substratum: 20 to 37 inches (50 to 93 cm)
Runoff: slow to medium
Depth to water table: greater than 72 inches (183 cm)
Hazard of erosion: by water—slight to moderate; by wind—severe
Root-restricting feature: 20 to 37 inches (50 to 93 cm)

Included Areas

Contrasting inclusions:
*small lakes
*soils with stones and boulders on or near the surface

Major Uses

Current uses: wildlife habitat and recreation

Major Management Factors

Elevation: 300 to 500 feet (91 to 150 m)
Climatic factors (average annual):
*precipitation—28 inches (71 cm)
*air temperature—32 °F (0 °C)
*growing degree days—1250 to 1500
Soil related factors: depth to water table and inadequate drainage outlets (Figure 4)

Woodland

Strandline Soils

*The principal tree species is white spruce.
*Among the common forest understory plants are bluejoint grass, alders, forbs, and spirea.

Mean site index (100 year site curve) for white spruce on Strandline soil: 70

General management considerations:
*Since the soil is highly erodible, only those logging methods that do not disturb the organic mat should be employed. Otherwise, siltation of nearby streams may result.
*The ballasting needed in bog areas increases the cost of constructing and maintaining roads.
*Repeated use of wheeled and tracked equipment is likely to compact the soil if it is wet.
*Trees suitable for planting include white spruce.

Suitable management practices:
*Use conventional equipment in harvesting, but limit its use when the soil is wet.
*Reduce the risk of erosion by seeding roads, cutbanks, and landings, and avoiding excessive disturbance on the soil surface.

Wildlife

This map unit provides habitat for porcupines, moose, bears, waterfowl, hawks, and wolverines.

235—Spenard silt loam, 0 to 7 percent slopes

Composition

Spenard soil and similar inclusions: 85 percent
Contrasting inclusions: 15 percent

Characteristics of the Spenard Soil

Position on the landscape: moraines, mountain footslopes, and side slopes
Slope range: 0 to 7 percent
Slope features: shape—convex
Organic mat on surface: 0 to 10 inches (0 to 25 cm) thick
Native vegetation: white spruce, black spruce, paper birch, bluejoint grass, ferns, alders, and horsetail

Typical profile:
*0 to 4 inches (0 to 10 cm)—dark reddish brown silt loam
*4 to 14 inches (10 to 35 cm)—brown and yellowish brown silt loam
*14 to 16 inches (35 to 40 cm)—grayish brown sandy loam
*16 to 25 inches (40 to 63 cm)—dark brown silt loam
*25 to 60 inches (63 to 150 cm)—yellowish brown gravelly loam

Depth class: very deep
Drainage class: very poorly drained
Permeability: in the loess mantle—moderate; in the firm glacial till substratum—moderately slow
Available water capacity: very high
Depth to firm glacial till substratum: 20 to 36 inches (50 to 91 cm)
Runoff: slow to medium
Depth to water table: 0 to 24 inches (0 to 60 cm)
Hazard of erosion: by water—moderate; by wind—severe
Root-restricting feature: firm glacial till substratum at a depth of 20 to 36 inches (50 to 91 cm)

Included Areas

*soils on similar landscape positions that are well drained
*soils on footslope positions that have a thick organic surface layer and are very poorly drained
*muskegs
*soils with stones and boulders on or near the surface

Major Uses

Current uses: wildlife habitat and recreation
Potential uses: hayland and pastureland

Major Management Factors

Elevation: 50 to 1500 feet (15 to 457 m)
Climatic factors (average annual):
*precipitation—28 inches (71 cm)
*air temperature—32 °F (0 °C)
*growing degree days—1250 to 1500
Soil related factors: depth to water table, water erosion, wind erosion, and low fertility

Hayland and Pastureland

General management considerations:
*Most climatically adapted grasses can be grown if they are fertilized and limed according to soil test results.
*Wetness limits the choice of plants.
*Stones and boulders on or near the surface in some areas may limit field operations.

Suitable management practices:
*Seed only the hay and pasture plants that tolerate seasonal wetness, such as creeping foxtail.
*Maintain or improve fertility by fertilizing and liming according to soil test results.
*Reduce the risk of wind and water erosion by maintaining a permanent pasture or native plant cover.

Wildlife

This map unit provides habitat for moose, bears, shrews and voles, hares, and porcupines.

236—Starichkof peat, 0 to 7 percent slopes

Composition

Starichkof peat soil and similar inclusions: 90 percent
Contrasting inclusions: 10 percent

Characteristics of the Starichkof Soil

Position on the landscape: muskegs
Slope range: 0 to 7 percent
Slope features: shape—plane to concave
Native vegetation: sphagnum moss, bog birch, ericaceous shrubs, black spruce, and willows

Typical profile:
*0 to 27 inches (0 to 68 cm)—dark brown peat
*27 to 30 inches (68 to 76 cm)—grayish brown fine sandy loam
*30 to 40 inches (76 to 100 cm)—dark brown peat
*40 to 41 inches (100 to 104 cm)—grayish brown silt loam
*41 to 63 inches (104 to 160 cm)—dark brown peat

Depth class: very deep
Drainage class: very poorly drained
Permeability: rapid
Available water capacity: very high
Runoff: ponded to medium
Depth to water table: +12 to 6 inches (+30 to 15 cm)

Included Areas

Contrasting inclusions:
*small lakes and drainageways
*mineral soils
*soils with stones and boulders on or near the surface

Major Uses

Current uses: wildlife habitat and recreation

Major Management Factors

Elevation: 50 to 1500 feet (15 to 457 m)
Climatic factors (average annual):
*precipitation—28 inches (71 cm)
*air temperature—32 °F (0 °C)
*growing degree days—1250 to 1500
Soil related factors: depth to water table and inadequate drainage outlets (Figure 5)

Wildlife

This map unit provides habitat for moose, bears, waterfowl, muskrats, and beaver.

237—Strandline-Kroto complex, 20 to 45 percent slopes

Composition

Strandline soil and similar inclusions: 45 percent
Kroto soil and similar inclusions: 40 percent
Contrasting inclusions: 15 percent

Characteristics of the Strandline Soil

Position on the landscape: moraines and mountain footslopes
Slope range: 20 to 45 percent
Slope features: shape—convex; hilly to very steep
Organic mat on surface: 1 to 4 inches (2 to 10 cm) thick
Native vegetation: white spruce, paper birch, bluejoint grass, alders, and forbs

Typical profile:
*0 to 2 inches (0 to 5 cm)—dark reddish brown silt loam
*2 to 5 inches (5 to 12 cm)—gray silt loam
*5 to 8 inches (12 to 20 cm)—dark reddish brown silt loam

*8 to 15 inches (20 to 38 cm)—dark brown silt loam
*15 to 20 inches (38 to 50 cm)—dark yellowish brown and brownish yellow silt loam
*20 to 22 inches (50 to 55 cm)—gray silt loam
*22 to 26 inches (55 to 66 cm)—dark yellowish brown silt loam
*26 to 31 inches (66 to 78 cm)—dark grayish brown silt loam
*31 to 60 inches (78 to 150 cm)—olive gray gravelly silt loam

Depth class: very deep
Drainage class: well drained
Permeability: in the loess mantle—moderate; in the glacial till substratum—moderately slow
Available water capacity: very high
Depth to firm glacial till substratum: 20 to 37 inches (50 to 93 cm)
Runoff: rapid
Depth to water table: greater than 72 inches (183 cm)
Hazard of erosion: by water—severe; by wind—severe
Root-restricting feature: firm glacial till substratum at a depth of 20 to 37 inches (50 to 93 cm)

Characteristics of the Kroto Soil

Position on the landscape: moraines, hills, and mountain footslopes
Slope range: 20 to 45 percent
Slope features: shape—convex; hilly to very steep
Organic mat on surface: 1 to 4 inches (2 to 10 cm) thick
Native vegetation: white spruce, paper birch, bluejoint grass, alders, and forbs

Typical profile:
*0 to 2 inches (0 to 5 cm)—gray silt loam
*2 to 4 inches (5 to 10 cm)—dark reddish brown silt loam
*4 to 6 inches (10 to 15 cm)—strong brown silt loam
*6 to 12 inches (15 to 30 cm)—yellowish brown and dark yellowish brown silt loam
*12 to 14 inches (30 to 35 cm)—grayish brown silt loam
*14 to 19 inches (35 to 48 cm)—brown silt loam
*19 to 60 inches (48 to 150 cm)—olive brown gravelly silt loam

Depth class: very deep
Drainage class: well drained
Permeability: in the loess mantle—moderate; in the firm glacial till substratum—moderately slow
Available water capacity: very high
Depth to firm glacial till substratum: 10 to 20 inches (25 to 50 cm)
Runoff: rapid
Depth to water table: greater than 72 inches (183 cm)
Hazard of erosion: by water—severe; by wind—severe
Root-restricting feature: firm glacial till substratum at a depth of 10 to 20 inches (25 to 50 cm)

Included Areas

Contrasting inclusions:
*soils on similar landscape positions that have sandy and gravelly substrata at a depth of more than 20 inches (50 cm)
*mineral soils on footslopes of moraines that are poorly drained or very poorly drained
*muskegs
*soils with stones and boulders on or near the surface

Major Uses

Current uses: wildlife habitat and recreation
Potential uses: woodland and rural homesites

Major Management Factors

Elevation: 50 to 1500 feet (15 to 457 cm
Climatic factors (average annual):
*precipitation—28 inches (71 cm)
*air temperature—32 °F (0 °C)
*growing degree days—1250 to 1500
Soil related factors: stones and boulders on or near the surface in some areas (Figure 8), depth to glacial till substratum, water erosion, wind erosion, frost heaving, permeability, and slope.

Woodland

*The principal tree species are white spruce and paper birch.
*Among the common forest understory plants are bluejoint grass, alders, forbs, and ferns.

Mean site index (100 year site curve) for white spruce on Strandline soil: 70
Site index and yield for Kroto soil: not estimated but assumed to be similar to Strandline

General management considerations:
*Since the soil is highly erodible, only those logging methods that do not disturb the organic mat should be employed. Otherwise, siltation of nearby streams may result.

*The main limitation for the harvesting of timber is steep slopes on part of the mapping unit.
*Seeding is advisable if the soil has been disturbed by logging or fire.
*Trees suitable for planting include white spruce.

Suitable management practices:
*Use conventional equipment in harvesting, but limit its use when the soil is wet.
*Reduce the risk of erosion by seeding roads, cutbanks, and landings.
*Reduce the risk of erosion by seeding cuts and fills and stabilizing with a grass straw mulch.

Building Site Development

General management considerations:
*Excavation can expose soil material that is highly susceptible to wind and water erosion.
*The quality of roadbeds and road surfaces can be adversely affected by frost action.
*Conventional waste treatment systems can be expected to function poorly because of limited permeability, which restricts the movement and filtration of the effluent.
*The risk of seepage and the hazard of polluting the water supply limit the use of some areas of this unit for a conventional waste treatment system.
*Untreated effluent can move along the surface of the restrictive layer and seep in downslope areas, creating a health hazard.
*The permeability of the substratum may be highly variable over short distances.
*On-site investigation is needed to determine whether the area considered for a conventional waste treatment system is underlain by unsuitable material.

Suitable Management Practices:
*Design and construct buildings and access roads to compensate for steepness of slope.
*Revegetate disturbed areas at construction sites as soon as possible to reduce the hazard of erosion.
*Stockpile topsoil and use it to reclaim areas disturbed during construction.
*Consider the depth to which frost penetrates in designing footings and road bases.

Wildlife

This map unit provides habitat for moose, bears, foxes, small rodents, hawks, and owls.

238—Strandline-Kroto-Chichantna complex, 1 to 20 percent slopes

Composition

Strandline soil and similar inclusions: 30 percent
Kroto soil and similar inclusions: 30 percent
Chichantna soil and similar inclusions: 25 percent
Contrasting inclusions: 15 percent

Characteristics of the Strandline Soil

Position on the landscape: moraines and mountain footslopes
Slope range: 3 to 20 percent
Slope features: shape—plane to convex, undulating to hilly
Organic mat on surface: 1 to 4 inches (2 to 10 cm) thick
Native vegetation: white spruce, paper birch, bluejoint grass, alders, and forbs

Typical profile:
*0 to 2 inches (0 to 5 cm)—dark reddish brown silt loam
*2 to 5 inches (5 to 12 cm)—gray silt loam
*5 to 8 inches (12 to 20 cm)—dark reddish brown silt loam
*8 to 15 inches (20 to 38 cm)—dark brown silt loam
*15 to 20 inches (38 to 50 cm)—dark yellowish brown and brownish yellow silt loam
*20 to 22 inches (50 to 55 cm)—gray silt loam
*22 to 26 inches (55 to 66 cm)—dark yellowish brown silt loam
*26 to 31 inches (66 to 78 cm)—dark grayish brown silt loam
*31 to 60 inches (78 to 150 cm)—olive gray gravelly silt loam

Depth class: very deep
Drainage class: well drained
Permeability: in the loess mantle—moderate; in the glacial till substratum—moderately slow
Available water capacity: very high
Depth to firm glacial till substratum: 20 to 37 inches (50 to 93 cm)
Runoff: medium to rapid
Depth to water table: greater than 72 inches (183 cm)
Hazard of erosion: by water—moderate to severe; by wind—severe

Root-restricting feature: firm glacial till substratum at a depth of 20 to 37 inches (30 to 93 cm)

Characteristics of the Kroto Soil

Position on the landscape: moraines, hills, and mountain footslopes
Slope range: 3 to 20 percent
Slope features: shape—convex; undulating to hilly
Organic mat on surface: 1 to 4 inches (2 to 10 cm) thick
Native vegetation: white spruce, paper birch, bluejoint grass, alders, and forbs

Typical profile:
*0 to 2 inches (0 to 5 cm)—gray silt loam
*2 to 4 inches (5 to 10 cm)—dark reddish brown silt loam
*4 to 6 inches (10 to 15 cm)—strong brown silt loam
*6 to 12 inches (15 to 30 cm)—yellowish brown and dark yellowish brown silt loam
*12 to 14 inches (30 to 35 cm)—grayish brown silt loam
*14 to 19 inches (35 to 48 cm)—brown silt loam
*19 to 60 inches (48 to 150 cm)—olive brown gravelly silt loam

Depth class: very deep
Drainage class: well drained
Permeability: in the loess mantle—moderate; in the firm glacial till substratum—moderately slow
Available water capacity: very high
Depth to firm glacial till substratum: 10 to 20 inches (25 to 50 cm)
Runoff: medium to rapid
Depth to water table: greater than 72 inches (183 cm)
Hazard of erosion: by water—moderate to severe; by wind—severe
Root-restricting feature: firm glacial till substratum at a depth of 10 to 20 inches (25 to 50 cm)

Characteristics of the Chichantna Soil

Position on the landscape: muskegs
Slope range: 1 to 8 percent
Slope features: shape—concave
Native vegetation: mosses, sedges, bog birch, and ericaceous shrubs

Typical profile:
*0 to 15 inches (0 to 38 cm)—dark reddish brown peat
*15 to 16 inches (38 to 40 cm)—light olive brown fine sandy loam
*16 to 28 inches (40 to 71 cm)—dark reddish brown muck
*28 to 35 inches (71 to 88 cm)—olive yellow loam
*35 to 64 inches (88 to 162 cm)—dark reddish brown muck

Depth class: very deep
Drainage class: very poorly drained
Permeability: in the thin stratified loamy material—moderate; in the organic material—rapid
Available water capacity: very high
Runoff: slow to medium
Depth to water table: 0 to 6 inches (0 to 15 cm), except on the steeper slopes where it may be 8 to 16 inches (20 to 40 cm) below the surface

Included Areas

Contrasting inclusions:
*soils that have slopes of more than 20 percent
*mineral soils on moraines and mountain footslopes that are poorly or very poorly drained
*streams and small lakes
*soils with stones and boulders on or near the surface

Major Uses

Current uses: wildlife habitat and recreation
Potential uses: hayland and pastureland, woodland, and rural homesites

Major Management Factors

Elevation: 50 to 1500 feet (15 to 457 cm)
Climatic factors (average annual):
*precipitation—28 inches (71 cm)
*air temperature—32 °F (0 °C)
*growing degree days—1250 to 1500
Soil related factors: water erosion, wind erosion, frost heaving, permeability, slope, low fertility, depth to water table, load supporting capacity, and subsidence

Hayland and Pastureland

General management considerations:
*Adapted grasses respond to fertilizer and lime.
*Stones and boulders on or near the surface in some areas may limit field operations.
*In muskeg areas, wetness restricts the current and potential uses to wildlife habitat and recreation.

Suitable management practices:
*Maintain or improve fertility by fertilizing and liming according to soil test results.

*Reduce the risk of water and wind erosion by maintaining permanent pasture or native plant cover.

Woodland

Strandline Soils

*The principal tree species is white spruce.
*Among the common forest understory plants are bluejoint grass, alders, forbs, and spirea.

Mean site index (100 year site curve) for white spruce on Strandline soil: 70
Site index and yields for Kroto soil: not estimated but assumed similar to Strandline

General management considerations:
*Since the soil is highly erodible, only those logging methods that do not disturb the organic mat should be employed. Otherwise, siltation of nearby streams may result.
*The ballasting needed in bog areas increases the cost of constructing and maintaining roads.
*Repeated use of wheeled and tracked equipment is likely to compact the soil if it is wet.
*Trees suitable for planting include white spruce.

Suitable management practices:
*Use conventional equipment in harvesting, but limit its use when the soil is wet.
*Reduce the risk of erosion by seeding roads, cutbanks, and landings, and avoiding excessive disturbance on the soil surface.

Building Site Development

Strandline and Kroto Soils

General management considerations:
*Excavation can expose soil material that is highly susceptible to wind and water erosion.
*Frost action limits construction of access roads, driveways, and buildings.
*Conventional sewage treatment systems can be expected to function poorly because of limited permeability which restricts the movement and filtration of the effluent.
*Untreated effluent can move along the surface of the restrictive layer and seep in downslope areas, creating a health hazard.
*The permeability of the substratum may be highly variable over short distances.
*On-site investigation is needed to determine whether the area considered for a conventional waste treatment system is underlain by unsuitable material.

Suitable management practices:
*Design and construct buildings and access roads to compensate for steepness of slope.
*Revegetate disturbed areas at construction sites as soon as possible to reduce the hazard of erosion.
*Stockpile topsoil and use it to reclaim areas disturbed during construction.
*Consider the depth to which frost penetrates in designing footings and road bases.

Chichantna Soil

Due to subsidence, low strength, wetness, frost heaving, and hazard of seepage, this portion of the map unit is unsuited for urban use.

Wildlife

This map unit provides habitat for moose, bears, forest and wetland birds, shrews, and porcupines.

239—Strandline-Kroto-Slikok complex, 1 to 12 percent slopes

Composition

Strandline soil and similar inclusions: 30 percent
Kroto soil and similar inclusions: 30 percent
Slikok soil and similar inclusions: 25 percent
Contrasting inclusions: 15 percent

Characteristics of the Strandline Soil

Position on the landscape: moraines and mountain footslopes
Slope range: 2 to 12 percent
Slope features: shape—convex, level to rolling
Organic mat on surface: 1 to 4 inches (2 to 10 cm) thick
Native vegetation: white spruce, paper birch, bluejoint grass, alders, and forbs

Typical profile:
*0 to 2 inches (0 to 5 cm)—dark reddish brown silt loam
*2 to 5 inches (5 to 12 cm)—gray silt loam
*5 to 8 inches (12 to 20 cm)—dark reddish brown silt loam
*8 to 15 inches (20 to 38 cm)—dark brown silt loam
*15 to 20 inches (38 to 50 cm)—dark yellowish brown and brownish yellow silt loam
*20 to 22 inches (50 to 55 cm)—gray silt loam
*22 to 26 inches (55 to 66 cm)—dark yellowish brown silt loam

*26 to 31 inches (66 to 78 cm)—dark grayish brown silt loam
*31 to 60 inches (78 to 150 cm)—olive gray gravelly silt loam

Depth class: very deep
Drainage class: well drained
Permeability: in the loess mantle—moderate; in the glacial till substratum—moderately slow
Available water capacity: very high
Depth to firm glacial till substratum: 20 to 37 inches (50 to 93 cm)
Runoff: slow to medium
Depth to water table: greater than 72 inches (183 cm)
Hazard of erosion: by water—slight to moderate; by wind—severe
Root-restricting feature: firm glacial till substratum at a depth of 20 to 37 inches (50 to 93 cm)

Characteristics of the Kroto Soil

Position on the landscape: moraines, hills, and mountain footslopes
Slope range: 1 to 12 percent
Slope features: shape—convex; nearly level to hilly
Organic mat on surface: 1 to 4 inches (2 to 10 cm) thick
Native vegetation: white spruce, paper birch, bluejoint grass, alders, and forbs

Typical profile:
*0 to 2 inches (0 to 5 cm)—gray silt loam
*2 to 4 inches (5 to 10 cm)—dark reddish brown silt loam
*4 to 6 inches (10 to 15 cm)—strong brown silt loam
*6 to 12 inches (15 to 30 cm)—yellowish brown and dark yellowish brown silt loam
*12 to 14 inches (30 to 35 cm)—grayish brown silt loam
*14 to 19 inches (35 to 48 cm)—brown silt loam
*19 to 60 inches (48 to 150 cm)—olive brown gravelly silt loam

Depth class: very deep
Drainage class: well drained
Permeability: in the loess mantle—moderate; in the firm glacial till substratum—moderately slow
Available water capacity: very high
Depth to firm glacial till substratum: 10 to 20 inches (25 to 50 cm)
Runoff: slow to medium
Depth to water table: greater than 72 inches (183 cm)
Hazard of erosion: by water—slight to moderate; by wind—severe
Root-restricting feature: firm glacial till substratum at a depth of 10 to 20 inches (25 to 50 cm)

Characteristics of the Slikok Soil

Position on the landscape: toeslopes of moraines, muskeg borders, and depressional areas
Slope range: 1 to 5 percent
Slope features: shape—concave
Organic mat on surface: 5 to 15 inches (12 to 38 cm) thick
Native vegetation: black spruce, paper birch, bluejoint grass, horsetail, and willows

Typical profile:
*0 to 41 inches (0 to 104 cm)—dark yellowish brown to very dark brown mucky silt loam
*41 to 60 inches (104 to 150 cm)—grayish brown gravelly silt loam

Depth class: very deep
Drainage class: very poorly drained
Permeability: in the upper part—moderate; in the glacial till substratum—slow
Available water capacity: high
Depth to firm glacial till substratum: 40 to 60 inches (100 to 150 cm)
Runoff: ponded to slow
Depth to water table: +12 to 12 inches (+30 to 30 cm)
Hazard of erosion: by water—slight to moderate; by wind—slight

Included Areas

Contrasting inclusions:
*soils on similar landscape positions that have sandy and gravelly substratum at a depth of more than 20 inches (50 cm)
*muskegs
*soils with stones and boulders on or near the surface

Major Uses

Current uses: wildlife habitat and recreation
Potential uses: hayland and pastureland, woodland, and rural homesites

Major Management Factors

Elevation: 50 to 1500 feet (15 to 457 cm)
Climatic factors (average annual):
*precipitation—28 inches (71 cm)
*air temperature—32 °F (0 °C)
*growing degree days—1250 to 1500

Soil related factors: stones and boulders on or near the surface in some areas, depth to water table, depth to glacial till substratum, inadequate drainage outlets, water erosion, wind erosion, frost heaving, permeability, low fertility, and slope.

Hayland and Pastureland

General management considerations:
*Grasses and crops respond to fertilizer and lime.
*Suitable crops for planting are grasses and hardy, cool-season vegetables.
*Wetness limits the choice of plants.
*Seedbeds should be prepared on the contour or across the slope where practical.
*Stones and boulders on or near the surface in some areas may limit field operations.
*The firm substratum at shallow depths may restrict root growth.

Suitable management practices:
*Maintain or improve fertility by fertilizing and liming according to soil test results.
*Reduce the risk of water and wind erosion by maintaining permanent pasture or native plant cover.
*When clearing land, strips of trees should be left as windbreaks.
*Keep hayland and pastureland in permanent native or adapted species cover.

Woodland

Strandline Soils

*The principal tree species are white spruce.
*Among the common forest understory plants are bluejoint grass, alders, forbs, and spirea.

Mean site index (100 year site curve) for white spruce on Strandline soil: 70
Site index and yields for Kroto soil: not estimated but assumed similar to Strandline

General management considerations:
*Since the soil is highly erodible, only those logging methods that do not disturb the organic mat should be employed. Otherwise, siltation of nearby streams may result.
*The ballasting needed in bog areas increases the cost of constructing and maintaining roads.
*Repeated use of wheeled and tracked equipment is likely to compact the soil if it is wet.
*Trees suitable for planting include white spruce.

Building Site Development

Strandline and Kroto Soils

General management considerations:
*Excavation can expose soil material that is highly susceptible to wind and water erosion.
*The quality of roadbeds and road surfaces can be adversely affected by frost action.
*Conventional waste treatment systems can be expected to function poorly because of seasonal wetness and limited permeability, which restricts the movement and filtration of the effluent.
*The risk of seepage and the hazard of polluting the water supply limit the use of some areas of this unit for a conventional waste treatment system.
*Untreated effluent can move along the surface of the restrictive layer and seep in downslope areas, creating a health hazard.
*The permeability of the substratum may be highly variable over short distances.
*On-site investigation is needed to determine whether the area considered for a conventional waste treatment system is underlain by unsuitable material.

Suitable management practices:
*Design and construct buildings and access roads to compensate for slope.
*Revegetate disturbed areas at construction sites as soon as possible to reduce the hazard of erosion.
*Stockpile topsoil and use it to reclaim areas disturbed during construction.
*Consider the depth to which frost penetrates in designing footings and road bases.

Slikok Soil

Due to subsidence, low strength, wetness, and frost heaving, this portion of the map unit is unsuited for urban use.

Wildlife

This map unit provides habitat for moose, bears, porcupines, hares, foxes and coyotes, hawks and owls.

240—Strandline-Spenard-Kroto complex, 2 to 30 percent slopes

Composition

Strandline soil and similar inclusions: 30 percent

Spenard soil and similar inclusions: 30 percent
Kroto soil and similar inclusions: 25 percent
Contrasting inclusions: 15 percent

Characteristics of the Strandline Soil

Position on the landscape: moraines and mountain footslopes
Slope range: 5 to 30 percent
Slope features: shape—convex, undulating to steep
Organic mat on surface: 1 to 4 inches (2 to 10 cm) thick
Native vegetation: white spruce, paper birch, bluejoint grass, alders, and forbs

Typical profile:
*0 to 2 inches (0 to 5 cm)—dark reddish brown silt loam
*2 to 5 inches (5 to 12 cm)—gray silt loam
*5 to 8 inches (12 to 20 cm)—dark reddish brown silt loam
*8 to 15 inches (20 to 38 cm)—dark brown silt loam
*15 to 20 inches (38 to 50 cm)—dark yellowish brown and brownish yellow silt loam
*20 to 22 inches (50 to 55 cm)—gray silt loam
*22 to 26 inches (55 to 66 cm)—dark yellowish brown silt loam
*26 to 31 inches (66 to 78 cm)—dark grayish brown silt loam
*31 to 60 inches (78 to 150 cm)—olive gray gravelly silt loam

Depth class: very deep
Drainage class: well drained
Permeability: in the loess mantle—moderate; in the glacial till substratum—moderately slow
Available water capacity: very high
Depth to firm glacial till substratum: 20 to 37 inches (50 to 93 cm)
Runoff: medium to rapid
Depth to water table: greater than 72 inches (183 cm)
Hazard of erosion: by water—slight to severe; by wind—severe
Root-restricting feature: firm glacial till substratum at a depth of 20 to 37 inches (50 to 93 cm)

Characteristics of the Spenard Soil

Position on the landscape: moraines, mountain side slopes, and footslopes
Slope range: 2 to 12 percent
Slope features: shape—concave to convex
Organic mat on surface: 0 to 10 inches (0 to 25 cm) thick
Native vegetation: white spruce, paper birch, ferns, bluejoint grass, alders, and forbs
Typical profile:
*0 to 4 inches (0 to 10 cm)—dark reddish brown silt loam
*4 to 14 inches (10 to 35 cm)—brown and yellowish brown silt loam
*14 to 16 inches (35 to 40 cm)—grayish brown sandy loam
*16 to 25 inches (40 to 63 cm)—dark brown silt loam
*25 to 60 inches (63 to 150 cm)—yellowish brown gravelly loam

Depth class: very deep
Drainage class: very poorly drained
Permeability: in the loess mantle—moderate; in the glacial till substratum—moderately slow
Available water capacity: very high
Depth to firm glacial till substratum: 20 to 36 inches (50 to 91 cm)
Runoff: slow to medium
Depth to water table: 0 to 24 inches (0 to 60 cm)
Hazard of erosion: by water—slight to moderate; by wind—severe
Root-restricting feature: firm glacial till substratum at a depth of 20 to 36 inches (50 to 91 cm)

Characteristics of the Kroto Soil

Position on the landscape: moraines, hills, and mountain footslopes
Slope range: 5 to 30 percent
Slope features: shape—convex; undulating to steep
Organic mat on surface: 1 to 4 inches (2 to 10 cm) thick
Native vegetation: white spruce, paper birch, bluejoint grass, alders, and forbs

Typical profile:
*0 to 2 inches (0 to 5 cm)—gray silt loam
*2 to 4 inches (5 to 10 cm)—dark reddish brown silt loam
*4 to 6 inches (10 to 15 cm)—strong brown silt loam
*6 to 12 inches (15 to 30 cm)—yellowish brown and dark yellowish brown silt loam
*12 to 14 inches (30 to 35 cm)—grayish brown silt loam
*14 to 19 inches (35 to 48 cm)—brown silt loam
*19 to 60 inches (48 to 150 cm)—olive brown gravelly silt loam

Depth class: very deep
Drainage class: well drained
Permeability: in the loess mantle—moderate; in the firm glacial till substratum—moderately slow

Available water capacity: very high
Depth to firm glacial till substratum: 10 to 20 inches (25 to 50 cm)
Runoff: medium to rapid
Depth to water table: greater than 72 inches (183 cm)
Hazard of erosion: by water—moderate to severe; by wind—severe
Root-restricting feature: firm glacial till substratum at a depth of 10 to 20 inches (25 to 50 cm)

Included Areas

Contrasting inclusions:
*soils on similar landscape positions that have sandy and gravelly substratum at a depth of more than 20 inches (50 cm)
*muskegs
*soils with stones and boulders on or near the surface

Major Uses

Current uses: wildlife habitat and recreation (Figure 7)
Potential uses: hayland and pastureland, woodland, and rural homesites

Major Management Factors

Elevation: 50 to 1500 feet (15 to 457 cm)
Climatic factors (average annual):
*precipitation—28 inches (71 cm)
*air temperature—32 °F (0 °C)
*growing degree days—1250 to 1500
Soil related factors: stones and boulders on or near the surface in some areas, depth to water table, depth to glacial till substratum, inadequate drainage outlets, water erosion, wind erosion, frost heaving, permeability, low fertility, and slope.

Hayland and Pastureland

General management considerations:
*Grasses respond to fertilizer and lime.
*Providing drainage is difficult because most areas have poor outlets.
*Wetness limits the choice of plants.
*Stones and boulders on or near the surface in some areas may limit field operations.

Suitable management practices:
*In low wet areas, seed only the hay and pasture plants that tolerate seasonal wetness such as creeping foxtail.
*Well drained soils may be planted to timothy or brome.
*Fertilize and lime according to soil test results.
*Reduce the risk of wind and water erosion by growing a cover crop.
*Keep in permanent native plant cover.

Woodland

*The principal tree species are white spruce and paper birch.
*Among the common forest understory plants are bluejoint grass, alders, forbs, and ferns.

Mean site index (100 year site curve) for white spruce on Strandline soil: 70
Site index and yields for Kroto soil: not estimated but assumed similar to Strandline

General management considerations:
*The main limitations for harvesting timber are very poorly drained Spenard soils and steep slopes on part of the map unit.
*Repeated use of wheeled and tracked equipment is likely to compact the soil if it is wet.
*Since the soils in most of the unit are highly erodible, only those logging methods that do not disturb the organic mat should be employed. Otherwise, siltation of nearby streams may result.
*Seeding is advisable if the soil has been disturbed by logging or fire.
*Trees suitable for planting include white spruce.

Suitable management practices:
*Use conventional equipment in harvesting, but limit its use when the soil is wet.
*Reduce the risk of erosion by seeding roads, cutbanks, and landings, and avoiding excessive disturbance on the soil surface.

Building Site Development

General management considerations:
*Excavation can expose soil material that is highly susceptible to wind and water erosion.
*The quality of roadbeds and road surfaces can be adversely affected by frost action.
*Conventional sewage treatment systems can be expected to function poorly because of seasonal wetness and limited permeability, which restricts the movement and filtration of the effluent.
*Untreated effluent can move along the surface of the restrictive layer and seep in downslope areas, creating a health hazard.

*The permeability of the substratum may be highly variable over short distances.
*On-site investigation is needed to determine whether the area considered for a conventional waste treatment system is underlain by unsuitable material.
Suitable management practices:
*Design and construct buildings and access roads to compensate for steepness of slope.
*Revegetate disturbed areas at construction sites as soon as possible to reduce the hazard of erosion.
*Stockpile topsoil and use it to reclaim areas disturbed during construction.
*Consider the depth to which frost penetrates in designing footings and road bases.

Spenard Soil

Due to wetness and frost heaving, this portion of the map unit is unsuited for urban use.

Wildlife

This map unit provides habitat for moose, bears, forest and wetland birds, shrews, and porcupines.

241—Suntrana silt loam, 2 to 7 percent slopes

Composition

Suntrana soil and similar inclusions: 85 percent
Contrasting inclusions: 15 percent

Characteristics of the Suntrana Soil

Position on the landscape: remnant glacial moraines adjacent to Cook Inlet
Slope range: 2 to 7 percent
Slope features: shape—convex; nearly level to gently rolling
Organic mat on surface: 2 to 6 inches (5 to 15 cm) thick
Native vegetation: black spruce with white spruce, paper birch, alder, bluejoint grass, and forbs

Typical profile:
*0 to 1 inch (0 to 2 cm)—dark grayish brown silt loam
*1 to 5 inches (2 to 12 cm)—very dark gray over dark brown silt loam
*5 to 10 inches (12 to 25 cm)—grayish brown very fine sandy loam
*10 to 20 inches (25 to 50 cm)—pale brown silt loam
*20 to 60 inches (50 to 150 cm)—brown silty clay loam
Depth class: very deep
Drainage class: poorly drained
Permeability: in the loess mantle—moderate; in the firm substratum—very slow
Available water capacity: very high
Depth to firm alluvial material: 10 to 20 inches (25 to 50 cm)
Runoff: slow to medium
Depth to water table: 12 to 24 inches (30 to 61 cm)
Hazard of erosion: by water—slight to moderate; by wind—severe
Root-restricting feature: firm alluvial material over glacial till substratum at a depth of 10 to 20 inches (25 to 50 cm)

Included Areas

*mineral soils in depressional areas that are somewhat poorly drained
*muskegs
*soils with stones and boulders on or near the soil surface

Major Uses

Current uses: wildlife habitat and recreation
Potential uses: hayland and pastureland

Major Management Factors

Elevation: 20 to 200 feet (6 to 60 m)
Climatic factors (average annual):
*precipitation—28 inches (71 cm)
*air temperature—32 °F (0 °C)
*growing degree days—1250 to 1500
Soil related factors: depth to water table, depth to firm alluvial sediments, wind erosion, and low fertility

Hayland and Pastureland

General management considerations:
*Grasses grow well if they are adequately fertilized.
*Suitable species for planting are adapted grasses and legumes.
*Wetness limits the choice of plants.
*Stones and boulders on or near the soil surface in some areas limit field operations.
*The firm substratum at shallow depths may restrict root growth.

Suitable management practices:
*Seed only hay and pasture plants that tolerate seasonal wetness.

*Maintain or improve fertility by fertilizing and liming according to soil test results and using conservation tillage.
*When clearing, strips of trees should be left as windbreaks.
*Keep hayland and pastureland in permanent native or adapted species cover.

Wildlife

This map unit provides habitat for moose, bears, coyotes, foxes, porcupines, and hares.

242—Susitna-Niklason silt loams, 0 to 2 percent slopes

Composition

Susitna soil and similar inclusions: 50 percent
Niklason soil and similar inclusions: 35 percent
Contrasting inclusions: 15 percent

Characteristics of the Susitna Soil

Positions on landscape: floodplains and alluvial terraces
Slope range: 0 to 2 percent
Slope features: shape—plane to convex
Organic mat on surface: 1 to 4 inches (2 to 10 cm) thick
Native vegetation: balsam poplar, white spruce, alders, and bluejoint grass

Typical profile:
*0 to 4 inches (0 to 10 cm)—very dark grayish brown silt loam
*4 to 15 inches (10 to 38 cm)—pale brown stratified fine sandy loam and loamy fine sand
*15 to 31 inches (38 to 78 cm)—dark gray stratified silt loam and very fine sandy loam
*31 to 48 inches (78 to 121 cm)—dark gray loam
*48 to 60 inches (121 to 150 cm)—variegated very gravelly sand
Depth class: very deep
Drainage class: well drained
Permeability: in the loamy material—moderate; in the sand and gravel—rapid
Available water capacity: moderate
Depth to sand and gravel: more than 40 inches (101 cm)
Runoff: slow
Depth to water table: greater than 72 inches (183 cm)
Hazard of erosion: by water—moderate; by wind—severe
Flooding: occasional (In addition to spring and summer flooding hazard, intense freezing causes a winter flooding hazard.)

Characteristics of the Niklason Soil

Position on the landscape: floodplains and natural levees
Slope range: 0 to 2 percent
Slope features: shape—plane to convex
Organic mat on surface: 0 to 2 inches (0 to 5 cm) thick
Native vegetation: balsam poplar, white spruce, alders, and bluejoint grass

Typical profile:
*0 to 4 inches (0 to 10 cm)—dark brown silt loam
*4 to 21 inches (10 to 53 cm)—brown sandy loam
*21 to 25 inches (53 to 63 cm)—light gray silt loam
*25 to 60 inches (63 to 150 cm)—variegated extremely gravelly sand
Depth class: very deep
Drainage class: well drained
Permeability: in the loamy material—moderately rapid; in the sand and gravel—rapid
Available water capacity: low
Depth to sand and gravel: 14 to 26 inches (35 to 66 cm)
Runoff: slow
Depth to water table: greater than 72 inches (183 cm)
Hazard of erosion: by water—moderate; by wind—severe
Flooding: occasional (In addition to spring and summer flooding hazard, intense freezing causes a winter flooding hazard.)

Included Areas

Contrasting inclusions:
*riverwash
*stream channels
*soils on floodplains that are gravelly throughout the profile
*soils on floodplains that are somewhat poorly or poorly drained
*soils with stones and boulders on or near the surface

Major Uses

Current uses: wildlife habitat and recreation

Potential uses: hayland, pastureland, and woodland

Major Management Factors

Elevation: 25 to 1000 feet (7 to 304 cm)
Climatic factors (average annual):
*precipitation—28 inches (71 cm)
*air temperature—32 °F (0 °C)
*growing degree days—1250 to 1500
Soil related factors: water erosion, wind erosion, frost heaving, occasional flooding, and low fertility

Hayland and Pastureland

General management considerations:
*Most climatically adapted grasses can be grown if protection from flooding is provided.
*Suitable species for planting are adapted grasses and hardy, cool-season vegetables such as potatoes.
*Crops and grasses respond to fertilizer and lime.
*Stones and boulders on or near the soil surface in some areas limit field operations.

Suitable management practices:
*Seed only crops and hay and pasture plants that tolerate periodic inundation.
*Maintain or improve fertility by using conservation tillage and fertilizing and liming according to soil test results.
*Reduce the risk of wind and water erosion by using conservation tillage and maintaining crop residue.
*Windbreaks should be left as land clearing is done. They are needed to limit soil losses, maintain optimum crop yields, protect farm and ranch buildings, and provide cover for wildlife.
*Keep hayland and pastureland in permanent plant cover.

Woodland

*The principal tree species are white spruce, paper birch, and balsam poplar.
*Among the common forest understory plants are bluejoint grass, alders, and highbush cranberry.

Mean site index (100 years site curve) for white spruce on Susitna soil: 70
Mean site index (100 year site curve) for white spruce on Niklason soil: 72

General management considerations:
*The main limitation for the harvesting of timber is seasonal flooding hazard.
*Seeding is advisable if the soil has been disturbed by logging or fire.

Suitable management practices:
*Use conventional equipment in harvesting, but limit its use when the soil is wet.
*Reduce the risk of erosion by seeding roads, cutbanks, and landings, and avoiding excessive disturbance on the soil surface.

Wildlife

This map unit provides habitat for moose, bears, foxes, coyotes, hares, and birds.

243—Susitna and Niklason silt loams, 0 to 2 percent slopes

Composition

Susitna and Niklason soils and similar inclusions: 85 percent
Contrasting inclusions: 15 percent

Characteristics of the Susitna Soil

Positions on landscape: floodplains and alluvial terraces
Slope range: 0 to 2 percent
Slope features: shape—plane to convex
Organic mat on surface: 1 to 4 inches (2 to 10 cm) thick
Native vegetation: balsam poplar, white spruce, scattered paper birch, alders, and bluejoint grass.

Typical profile:
*0 to 4 inches (0 to 10 cm)—very dark grayish brown silt loam
*4 to 15 inches (10 to 38 cm)—pale brown stratified fine sandy loam and loamy fine sand
*15 to 31 inches (38 to 78 cm)—dark gray stratified silt loam and very fine sandy loam
*31 to 48 inches (78 to 121 cm)—dark gray loam
*48 to 60 inches (121 to 150 cm)—variegated very gravelly sand

Depth class: very deep
Drainage class: well drained
Permeability: in the loamy material—moderate; in the sand and gravel—rapid
Available water capacity: moderate
Depth to sand and gravel: more than 40 inches (101 cm)
Runoff: slow
Depth to water table: greater than 72 inches (183 cm)
Hazard of erosion: by water—severe; by wind—severe

Flooding: frequent (In addition to spring and summer flooding hazard, intense freezing causes a winter flooding hazard.)

Characteristics of the Niklason Soil

Position on the landscape: floodplains and alluvial fans
Slope range: 0 to 2 percent
Slope features: shape—plane to convex
Organic mat on surface: 0 to 2 inches (0 to 5 cm) thick
Native vegetation: balsam poplar, white spruce, scattered paper birch, alders, and bluejoint grass

Typical profile:
*0 to 4 inches (0 to 10 cm)—dark brown silt loam
*4 to 21 inches (10 to 53 cm)—brown sandy loam
*21 to 25 inches (53 to 63 cm)—light gray silt loam
*25 to 60 inches (63 to 150 cm)—variegated extremely gravelly sand

Depth class: very deep
Drainage class: well drained
Permeability: in the loamy material—moderately rapid; in the sand and gravel—rapid
Available water capacity: low
Depth to sand and gravel: 14 to 26 inches (35 to 66 cm)
Runoff: slow
Depth to water table: greater than 72 inches (183 cm)
Hazard of erosion: by water—severe; by wind—severe
Flooding: frequent (In addition to spring and summer flooding hazard, intense freezing causes a winter flooding hazard.)

Included Areas

Contrasting inclusions:
*soils on floodplains that are gravelly throughout the profile
*soils on floodplains that are somewhat poorly or poorly drained
*riverwash
*narrow stream channels

Major Uses

Current uses: wildlife habitat and recreation
Potential uses: hayland and pastureland and woodland

Major Management Factors

Elevation: 25 to 1000 feet (7 to 304 cm)
Climatic factors (average annual):
*precipitation—28 inches (71 cm)
*air temperature—32 °F (0 °C)
*growing degree days—1250 to 1500
Soil related factors: frequent flooding, water erosion, wind erosion, and low fertility

Hayland and Pastureland

General management considerations:
*Most climatically adapted crops can be grown if protection from flooding is provided.
*Suitable species for planting are adapted grasses, small grains such as barley, and hardy, cool-season vegetables such as potatoes.
*Seasonal flooding limits the production and harvesting of crops.
*Crops and grasses respond to fertilizer and lime.
*Stones and boulders on or near the soil surface in some areas limit field operations.

Suitable management practices:
*Seed only the hay and pasture plants that tolerate periodic inundation.
*Maintain or improve fertility by fertilizing and liming according to soil test results and using conservation tillage.
*Reduce the risk of wind and water erosion by maintaining crop residue on the surface, using conservation tillage, and keeping land in permanent native or adapted species cover.
*Windbreaks should be left as land clearing is done. They are needed to limit soil losses, maintain optimum crop yields, protect farm and ranch buildings, and provide cover for wildlife.

Woodland

*The principal tree species are white spruce, paper birch, and balsam poplar.
*Among the common forest understory plants are alders, forbs, bluejoint grass, devils club, and highbush cranberry.

Mean site index (100 years site curve) for white spruce on Susitna soil: 70
Mean site index (100 year site curve) for white spruce on Niklason soil: 72

General management considerations:
*Since the soil is highly erodible and subject to frequent flooding, only those logging methods that do not disturb the organic mat should be

employed. Otherwise, siltation of nearby streams may result.
*The main limitation for the harvesting of timber is periodic inundation.
*Seeding is advisable if the soil has been disturbed by logging or fire.
*Mortality of seedlings may be high due to frequent flooding.
*Trees suitable for planting include white spruce and balsam poplar.

Suitable management practices:
*Use conventional equipment in harvesting, but limit its use when the soil is wet.
*Reduce the risk of erosion by seeding roads, cutbanks, and landings, and avoiding excessive disturbance on the soil surface.

Wildlife

This map unit provides habitat for moose, bears, coyotes, small rodents, hawks, and owls.

244—Tyonek peat, 0 to 2 percent slopes

Composition

Tyonek soil and similar inclusions: 90 percent
Contrasting inclusions: 10 percent

Characteristics of the Tyonek Soil

Position on the landscape: toeslopes of moraines
Slope range: 0 to 2 percent
Slope features: shape—concave
Native vegetation: alders, white spruce, paper birch, and bluejoint grass

Typical profile:
*0 to 4 inches (0 to 10 cm)—very dark grayish brown peat
*4 to 10 inches (10 to 25 cm)—very dark grayish brown mucky peat
*10 to 11 inches (25 to 27 cm)—brown loamy sand
*11 to 26 inches (27 to 66 cm)—dark grayish brown muck
*26 to 32 inches (66 to 81 cm)—light brownish gray silt loam
*32 to 60 inches (81 to 150 cm)—dark grayish brown muck

Depth class: very deep
Drainage class: very poorly drained
Permeability: in the organic surface—rapid; in the stratified mineral and organic substratum—moderate
Available water capacity: very high
Runoff: slow
Depth to water table: 0 to 6 inches (0 to 15 cm

Included Areas

Contrasting inclusions:
·soils on footslopes of moraines that have less than 30 inches (76 cm) of organic matter over mineral materials

Major Uses

Current uses: wildlife habitat and recreation

Major Management Factors

Elevation: 50 to 800 feet (15 to 243 m)
Climatic factors (average annual):
*precipitation—28 inches (71 cm)
*air temperature—32 °F (0 °C)
*growing degree days—1250 to 1500
Soil related factors: depth to water table

Wildlife

This map unit provides habitat for moose, bears, and porcupines.

245—Wasilla silt loam, 0 to 2 percent slopes

Composition

Wasilla soil and similar inclusions: 90 percent
Contrasting inclusions: 10 percent

Characteristics of the Wasilla Soil

Position on the landscape: floodplains and alluvial terraces
Slope range: 0 to 2 percent
Slope features: shape—concave
Organic mat on surface: 2 to 7 inches (5 to 17 cm) thick
Native vegetation: mosses, sedges, ericaceous shrubs, and willows

Typical profile:
*0 to 10 inches (0 to 25 cm)—dark brown and very dark grayish brown silt loam
*10 to 26 inches (25 to 66 cm)—dark gray silt loam
*26 to 60 inches (66 to 150 cm)—light gray silt loam stratified with silty clay loam and fine sandy loam

Depth class: very deep
Drainage class: poorly drained
Permeability: moderately slow

Available water capacity: very high
Depth to sand and gravel: 40 to more than 60 inches (100 to more than 150 cm)
Runoff: slow
Depth to water table: 12 to 36 inches (30 to 91 cm)
Hazard of erosion: by water—moderate; by wind—severe
Flooding: frequent (In addition to spring and summer flooding hazard, intense freezing causes a winter flooding hazard.)

Included Areas

Contrasting inclusions:
*muskegs
*small lakes and streams
*mineral soils on slightly higher landscape positions that are moderately well drained

Major Uses

Current uses: wildlife habitat and recreation

Major Management Factors

Elevation: 25 to 1000 feet (7 to 34 m)
Climatic factors (average annual):
*precipitation—28 inches (71 cm)
*air temperature—32 °F (0 °C)
*growing degree days—1250 to 1500
Soil related factors: depth to water table, flooding, and frost heaving

Wildlife

This map unit provides habitat for moose, muskrats, beavers, hawks, and voles.

FIGURE 1—Puntilla and Kliskon soils, formed in loess over glacial till, support alpine grassland and forbs vegetation. Chuit and Nakochna soils are on the hills in the background.

FIGURE 2—The hummocky tundra surface, caused by frost heaving, is characteristic of Chuit and Nakochna soils and can be a major management factor.

FIGURE 3—Swift freshwater streams, such as Cache Creek, cut through glacial till and outwash deposits. These deposits underlie Kroto, Strandline and Cryorthents soils.

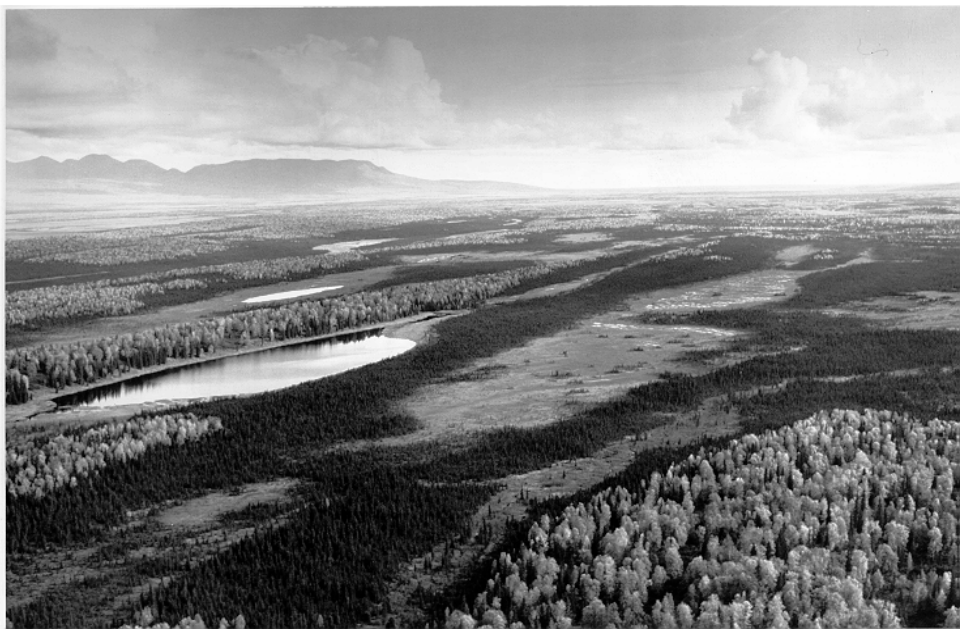

FIGURE 4—Areas of Slikok-Starichkof-Strandline complex include small lakes and ponded areas.

FIGURE 5—Sedges, mosses and scattered shrubs are on the very poorly drained Starichkof soils.

FIGURE 6—Strandline-Kroto complex occurs on this forested, recent terminal moraine.

FIGURE 7—Strandline-Spenard-Kroto complex soils are on old lateral moraines.

FIGURE 8—This area of nearly level to moderately steep Strandline-Spenard-Kroto complex is adjacent to glacier-fed Chelatna Lake.

FIGURE 9—Nancy, Kashwitna and Schrock soils are on stream terraces, such as along Lake Creek, and have good potential for woodland production. Mineral and organic soils are in a complex pattern on the adjacent upland till plain.

FIGURE 10—Killey, Hiline and Wasilla soils form in mineral alluvial deposits on the floodplains of braided glacial rivers.

FIGURE 11—High alpine communities of mosses, lichens, and dwarf shrubs grow on upland mineral soils of the survey area.

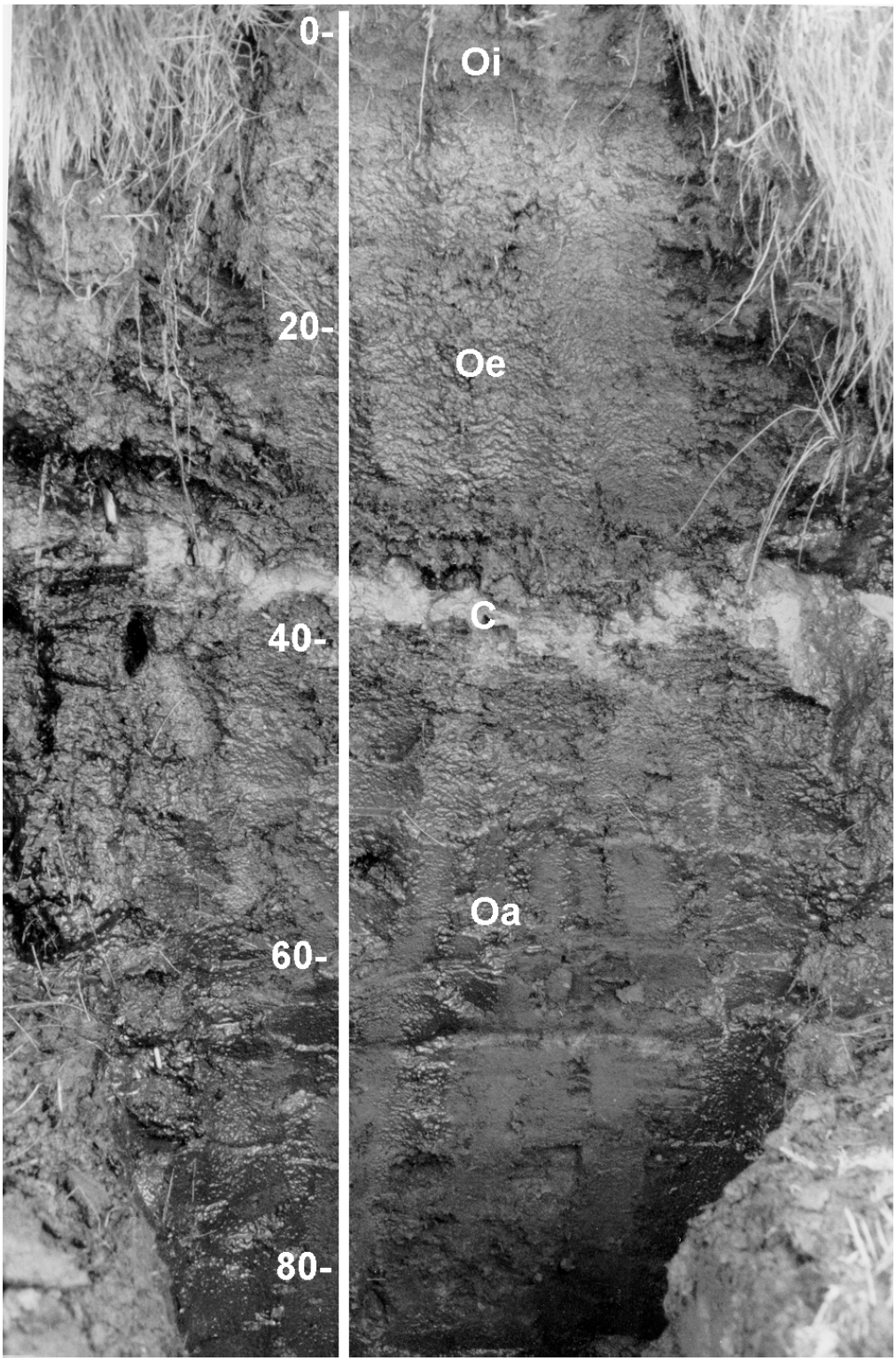

FIGURE 12—Thin, light-colored bands of ash are evident in a profile of the very poorly drained Chichantna peat. (Depths are in centimeters.)

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for campgrounds and playgrounds.

Crops and Pasture

Prepared by Allen Koester, former District Conservationist, Natural Resources Conservation Service, Palmer, Alaska

General management needed for crops and for hay and pasture is suggested in this section. The system of land capability classification used by the Natural Resources Conservation Service is explained.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under “Detailed Soil Map Units” (page 6). Specific information can be obtained from the local office of the Natural Resources Conservation Service or the Alaska Cooperative Extension.

Crops and Soils

In 1984, the Yentna Area had only minimal development of land into cropland or pasture. This was on a few homesites and old homesteads. Only small acreages were cleared for home gardens or perhaps pasture for livestock. A hindrance to developing the area at the present time is the lack of access. The limited surface access is by "ice roads" across the Susitna river in the winter or from the north on the "Oil Well Road" in the summer. The other access is by river boat or airplane. Because of the complex pattern of many of the soils in the survey, all surface routes must cross extensive areas of muskegs and other wet soils to get to potential agricultural areas.

The soils and climate of the Yentna Area are best suited to hay and cool season vegetables and potatoes. Because the weather is often rainy at harvest time, hay crops would be best suited for use as silage. There are several areas in the Yentna Area with a potential for agricultural development. Soils with a potential for agricultural production make up about 125,000 acres. The best soils to be cleared for cropland are Nancy-Kashwitna, Susitna-Niklason and Schrock soils. Large blocks of Nancy-Kashwitna soils occur in the Parker Lake and Whitsol Lake areas. A smaller block occurs near Shulin Lake. Other small areas occur along major streams. Nancy-Kashwitna and Schrock soils are upland soils and occur on higher stream terraces. Susitna-Niklason soils occur on floodplains along streams.

Strandline-Spenard-Kroto complex (Figure 8) is an extensive unit found throughout the survey area.

The Strandline and Kroto soils are upland soils often occurring on steep slopes, and Spenard soils are upland soils on less sloping areas that have a wetness limitation for agricultural uses. These soils occur in a complex pattern in the unit. On flatter slopes, Strandline and Kroto soils are suitable for farming. However, these soils are often found in small acreages. Extensive on-site investigation is necessary to identify the usable soils in this complex.

Fertilizer requirements will be high for all crops on all soils. Newly cleared land requires large amounts of nitrogen to help bacteria decompose the woody residues left after clearing. Most of the soils are acid with the pH ranging from 4.5 to 5.5. Crops on these soils would benefit from the application of agricultural lime to raise the pH. However, it is usually not economically feasible to apply lime. It is recommended that fertilizer and lime be applied according to soil tests. Crop residues should be returned to the soil to help improve water holding capacity and soil tilth.

All of the soils have a high erosion potential by wind and water. Thus, adequate conservation practices must be used to protect the land as it is cleared, developed and farmed. Windbreaks, crop rotations and permanent grass cover should all be used as needed. Contouring or planting across the slope is recommended for vegetables and potatoes. Conservation tillage practices, which leave residues on the surface, also protect the soil from erosion by wind and water. Because of the water erosion hazard, it is recommended that vegetables be kept on slopes of less than 4 percent; hay or pasture (permanent grass) on slopes of less than 12 percent. Slopes over 12 percent usually should not be cleared and developed because of the very high erosion hazard of the silt loam soils.

The flatter slopes of the survey area may have a surface drainage problem in the spring due to run-off water collecting in depressions. Field operations, tillage and planting may be delayed while these areas drain and dry out.

Several methods can be used to clear land. On large acreages, the vegetation can be knocked down by "chaining" with a heavy chain pulled between two bulldozers. The material is then stacked into berm rows and burned. On smaller acreages, the vegetation may be walked down with a bulldozer, stacked into berm rows and burned, or may simply be bulldozed into berm rows and burned. If economically feasible, saw logs and firewood may be salvaged prior to stacking. Clearing operations should usually be done after freeze up in the fall or in early spring. Summer clearing can be done if extra caution is used so that an excess amount of topsoil is not removed from the field and stacked into the berm. Initial tillage or "breaking" of the newly cleared land is usually done with a heavy disc or plow. A root rake may then be used to windrow the roots and sticks or they may be picked up by hand.

Further information on adapted crop varieties, crop production and fertilizer recommendations is available from the Alaska Cooperative Extension or Natural Resources Conservation Service.

Forest Productivity and Management

Lyn R. Townsend, Forester, Natural Resources Conservation Service, helped to prepare this section.

Soil surveys are becoming increasingly more important to forest managers as they seek ways of improving the productivity of the lands they manage. Certain soils have a higher potential productivity; some are more susceptible to compaction and erosion during and after harvesting; and others will require special efforts to reforest. Nancy, Kashwitna and Schrock soils (Figure 9) are examples of soils with a higher potential productivity. Detailed descriptions of the soil map units of the soil survey area list important forestry interpretations.

Each map unit suitable for producing wood crops has information in its description concerning forest vegetation and productivity, limitations for harvesting timber, and suitable forest growth and management practices. The methods and procedures used by foresters and soil scientists to develop the information are contained in the Natural Resources Conservation Service National Forestry Manual *(United States Department of Agriculture, 1980)*.

Table 5 summarizes forestry information given in the soil map unit and can serve as a quick reference for the more important forestry interpretations. Map unit symbols are listed, and the ordination (woodland suitability) symbol for each is given. All soils having the same ordination symbol require the same general kinds of woodland management and have about the same potential productivity.

The ordination symbol is based on a uniform system of labeling individual soils to determine the productivity potential and the principal soil properties in relation to any hazards of limitations of that soil. The first element of the ordination symbol is a number that denotes potential productivity in terms of cubic meters of wood per hectare per year for the indicator tree species (the principal species listed in the soil map unit having the highest productivity). Potential productivity is based on site index and the corresponding culmination of mean annual increment. For example, a number 1 would mean 1 cubic meter of wood per hectare per year (14.3 cubic feet per acre per year) and 10 would mean the soil

has potential for producing 10 cubic meters of wood per hectare per year (143 cubic feet per acre per year). The second element of the symbol, a letter, indicates the major kind of soil limitation for tree growth and management. The letter W, indicates excessive water in or on the soil; X, indicates restrictions because of rocks or stones; and R, restrictions due to steep slopes. The letter A indicates little or no limitations or restrictions.

In Table 5, the soils are also rated for a number of factors to be considered in management. Slight, moderate and severe are used to indicate the degree of major soil limitations. For each moderate or severe rating, a sentence in the applicable soil map unit explains the soil factor or factors that are the basis of that rating.

Equipment limitations ratings refer to the limits on the use of equipment, year-round or seasonally, as a result of soil characteristics. A rating of slight indicates that equipment use is not normally restricted in kind or time of year because of soil factors; moderate indicates a short seasonal limitation due to soil wetness, a fluctuating water table, or some other factor; and severe indicates a seasonal limitation, a need for special equipment, or a hazard in the use of equipment. Steepness of slopes and soil wetness are the main factors that cause equipment limitations. As slope gradient and length increase, it becomes more difficult to use wheeled equipment. Soil wetness, especially in combination with moderate texture, can severely limit the use of equipment during break-up and freezing.

Seedling mortality ratings refer to the probability of death of naturally occurring or planted tree seedlings as influenced by kinds of soil or topographic conditions. Plant competition is not considered in the ratings. The ratings apply to healthy, dormant seedlings from good stock that are properly planted during a period of sufficient soil moisture. Slight indicates no problem is expected under usual conditions; moderate indicates some problems of mortality can be expected, extra precautions are advisable; and severe indicates that mortality will be rough with extra precautions being essential for successful reforestation. Soil wetness, droughtiness of the surface layer, or ridgetop locations account for seedling mortality problems. To offset these, larger than usual planting stock, special site preparation, surface drainage, or reinforcement planting may be needed.

Ratings of windthrow hazard consider the soil characteristics that affect the development of tree roots and the ability of the soil to hold trees firmly. A rating of slight indicates that trees are not normally blown down by wind (strong winds may break trees but not uproot them); moderate, an occasional tree may blow down during periods of excessive wetness combined with moderate or strong winds; and severe, many trees may be expected to blow down during periods of soil wetness with moderate or strong winds. Restricted rooting depth due to a high water table, an impervious layer, or a coarse textured layer are the typical causes of windthrow or tree tipover. Moderate and severe ratings indicate the need for more care in thinning the edges of woodland stands, a plan calling for periodic salvage of windthrown trees, and an adequate road and trail system to allow for salvage operations.

Plant competition ratings refer to the likelihood of the invasion or growth of undesirable brushy plants when openings are made in the tree canopy. A slight rating indicates that unwanted brushy plants are not likely to delay the development of natural reforestation, and planted seedlings have good prospects for development without undue commotion. Moderate indicates that competition will delay natural or planted reforestation. Severe indicates competition can be expected to prevent natural or planted reforestation. Favorable climate and soil characteristics account for plant competition problems. In many cases, the key to predicting brush competition problems is the quantity and proximity of seed sources of undesirable plants or the quantity of unwanted brush rootstocks that will resprout after harvest activities. Moderate and severe ratings indicate the need for careful and thorough post-harvest clean-up in preparation for reforestation, and the possibility of mechanically or chemically treating brush to retard its growth and allow seedlings to develop.

The potential productivity of important trees on a soil is expressed as a site index. This index is determined by taking height and age measurements on selected trees within stands of a given species. The procedure and technique determining site index is given in the publications used for indicator species of the soil survey area *(Barnes, 1962; Meyer, 1937; Taylor, 1934; and British Columbia Forest Service, 1977)*. The site index applies to fully stocked, even-aged, unmanaged stands found on a particular soil map unit. Greatest timber yields, usually expressed in board-feet or cubic feet per acre, can be expected from soil map units with the highest site indexes. Site index values can be converted into estimated yields at various ages by carefully using the appropriate "yield" tables *(Barnes, 1962; Meyer, 1937; Taylor, 1934; and British Columbia Forest Service, 1977)*. Important trees are listed in the same order as that of their general occurrence observed on the soil map unit. Usually, only one or two tree species will predominate.

Trees to plant are those that are planted for reforestation or, if suitable conditions exist, allowed to naturally regenerate themselves. Species listed are suited to the soils and will produce a commercial wood crop. Desired product, topographic position (such as a ridgetop), and personal preference are three factors of many that can influence the choice of adapted trees to use for reforestation.

Recreation

The soils of the survey area are rated in Table 6 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, the ability of the soil to support vegetation, access to water, and potential water impoundment sites. Soils subject to flooding are limited, in varying degrees, for recreational uses by the duration of flooding and the season when it occurs. Onsite assessment of the height, duration, intensity, and frequency of flooding is essential in planning recreational facilities.

In Table 6, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in Table 6 can be supplemented by other information in this survey, for example, interpretations for dwellings without basements and for local roads and streets, in Table 7.

Camp areas are tracts of land used intensively as sites for tents, trailers, and campers and for outdoor activities that accompany such sites. These areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The soils are rated on the basis of soil properties that influence the ease of developing camp areas and performance of the areas after development. Also considered are the soil properties that influence trafficability and promote the growth of vegetation after heavy use.

Paths and trails are areas used for hiking and horseback riding. The areas should require little or no cutting and filling during site preparation. The soils are rated on the basis of soil properties that influence trafficability and erodibility. Paths and trails should remain firm under foot traffic and not be dusty when dry.

Wildlife Habitat

Prepared by Devony Lehner, former Wildlife Biologist, NRCS, Anchorage, Alaska

Soil-forming factors work together to produce different soils, each with a particular slope, depth, drainage, texture, color, chemical makeup, etc. In the same way, different soils and environments interact and support particular plant communities. In turn, these plant communities support characteristic wildlife communities, composed of animals best adapted to local habitats. These relationships come full circle as plants and animals interact with and affect both one another and the soils on (or in) which they are found.

A varied wildlife fauna is found in the Yentna Area, reflecting the variety of habitats present. Area birds, mammals and fish provide food, fur and recreation to local residents, other Alaskans and visitors. For discussing area wildlife, seven generalized types of plant and aquatic communities are listed:

1. upland forests
2. muskegs and bogs
3. riparian forests and shrublands
4. treeline grasslands, alder shrublands
5. alpine communities
6. saltwater wetlands
7. freshwater aquatic habitats

Upland Forests

Well drained upland soils, including Strandline, Kroto and Nancy soils, generally support three forest types. The three forest types are: 1) deciduous forests dominated by birch and/or aspen; 2) mixed coniferous-deciduous forests, dominated by birch, aspen and white spruce; and 3) coniferous forests dominated by white spruce. Overlap among these types is common because all represent stages in upland forest succession. This successional sequence generally proceeds from stands of young deciduous seedlings and saplings, through dense deciduous pole timber, through mixed stands with invading white spruce, to white spruce stands. White spruce forests then remain until a disturbance,

such as fire, again sets the sequence in motion. With each upland forest stage, different wildlife species appear.

Early successional deciduous stands provide abundant food for insects, birds and mammals. During summer, moose, black and brown bear, porcupine and snowshoe hare eat leaves and buds of young birch, aspen, willow, alder, rose and other shrubs, as well as grasses and forbs. In winter, twigs and bark become more important. Grasses and forbs provide food for small rodents such as voles and lemmings. Insect-eating shrews are common, as are both seed- and insect-eating birds such as ptarmigan, flycatchers, chickadees, thrushes, warblers and sparrows. Such stands also provide excellent habitats for muskrat and beaver when located near streams, lakes or ponds.

Predators occur wherever their prey are found, so coyote, ermine, least weasel, red fox, lynx, and sometimes wolverine and wolf may use young deciduous stands. Great-horned owls, great gray owls and sharp-shinned hawks may occur; but many raptors do not use these stands because shrubby understories make aerial pursuit difficult and suitable nesting trees are rare.

Deciduous stands decline in food value as tree limbs grow beyond reach of many mammals and as an increasingly dense canopy shades out many understory plants. Eventually, spruce trees invade the forest canopy as aging or weakened trees fall and understory plants begin to increase. Some browsers, grazers and predators return. In addition, animals generally dependent on conifers appear, including red and northern flying squirrels, spruce grouse, some woodpeckers and marten.

Finally, maturing white spruce come to dominate upland forests. Mosses deepen in shaded areas, but shrubs can remain vigorous in sunny openings. Some wildlife species become less abundant as deciduous trees decline, but others remain, among them, voles, shrews, squirrels, porcupine, hare, black bear, weasels, marten, red fox, lynx, coyote, woodpeckers, many songbirds and a variety of raptors. Near rivers, riparian fur bearers such as beaver, muskrat, mink and river otter will also be common and bald eagles and moose may occur.

Muskegs and Bogs

Muskegs, bogs and stunted black spruce forests are characterized by thick moss groundcover and poor soil drainage. Soils occurring in these areas include the very poorly drained Starichkof, Salamatof, Chichantna and Doroshin soils. Willow shrubs, bog blueberry, bog cranberry, grasses, sedges and other forbs may occur, providing food for moose, snowshoe hare, bog and brown lemmings, voles, black and brown bears and sparrows. Some insect-eating birds may be abundant, including thrushes, kinglets and warblers. Red fox, coyote, lynx, ermine, least weasel and occasionally wolverine may hunt in these communities. Cow moose frequently calve on or near muskegs in May and June. A number of waterfowl and shorebirds nest on or near muskeg lakes and ponds, including loons, grebes, ducks, geese and swans.

Although muskeg and bog communities may support abundant wildlife, they generally are not as productive as young deciduous forests or mature uneven-aged coniferous stands. Absence of large trees and impaired soil drainage often restrict the kinds and numbers of wildlife species present. Muskegs and bogs located close to other plant communities or to open water will usually support more varied wildlife than those occurring in large unbroken tracts.

Riparian Forests and Shrublands

Riparian areas tend to provide very diverse and productive habitats, both in relatively pure plant communities and in mosaic-like community mixtures caused by fires, windthrow, flooding and shifts in river channels. Habitat diversity means that many kinds of food and cover are available, and proximity to open water makes riparian habitats particularly valuable to many wildlife species. Two common riparian plant communities in the Yentna Area are cottonwood forests and riparian shrublands. The soils found in these areas include the well drained Susitna and Nikalson soils.

Cottonwood forests support a fauna comparable to that found in other deciduous riparian forests. Where forbs, grasses and berries (e.g., cranberry, wild currant, crowberry, salmon berry) are abundant, species such as black and brown bears, snowshoe hare, voles, lemmings, meadow jumping mouse, muskrat and porcupine may occur, along with predators such as red fox, weasels, mink, river otter, coyote, lynx and some raptors. Seed- and insect-eating birds will also be common. Where shrubs (particularly willows) and young deciduous cottonwoods dominate, moose, beaver, hare and their predators will be most numerous. Where groundcover consists mostly of *Equisetum* spp., bears and some snowshoe hare may occur, but many shrub- and seed-eating animals will be absent. Open forests with productive forb-grass groundcover can support large numbers of rodents, and hence, the fur bearers and raptors that feed on them.

Riparian shrublands support most of the wildlife species found in streamside forests, although tree-

dwelling birds will generally be absent, as will mammals requiring mature trees for food and cover. The soils found in these areas include the very poorly and poorly drained Killey, Hiline, Hewitt and Wasilla soils (Figure 10). Riparian willows and alders are essential to moose, providing them with food and cover during winter. Other species particularly common in streamside shrublands include snowshoe hare, beaver, river otter, mink and lynx. Many of the bird species listed in young deciduous forests are also present.

Treeline Grasslands and Alder Shrublands

Grasslands and alder shrublands are common at treeline, above forests and below tundra communities. Puntilla and Kliskon soils are found on these areas. Alder shrublands may provide cover and some food to herbivores (e.g., moose porcupine) and predators (e.g., bears, coyote, wolf, wolverine), but these dense shrublands generally have sparse understories and hence provide little food to many birds and mammals. Bird species common in alder shrublands include alder flycatcher and hermit and varied thrush.

Grasslands, on the other hand, although often providing little cover, offer nutrient-rich seeds and seasonally high primary productivity. They provide important foods to voles, lemmings, some seed-eating birds, bears seeking early emerging vegetation in spring and to predators feeding on grass-eating rodents. Moose often bed down in tall stands of grass.

Alpine Communities

Above alder shrublands and grasslands, alpine plant communities appear, consisting mostly of mosses, lichens, bunchgrasses, forbs and dwarf shrubs adapted to winds, cold temperatures, shallow soils and short growing seasons. The dominant soils in these areas are the well drained Chuit and Nakochna soils (Figure 11) with areas of barren rubble land. These plants provide valuable summer forage for moose, arctic ground squirrel, some voles and lemmings and brown bear. In the fall, as salmon runs end, ripening berries attract black and brown bears from lowland streams up to alpine areas. Talus slopes near herbaceous or dwarf shrub communities often support collared pika and hoary marmot. Wolverine, wolf, coyote, brown bear, ermine, red fox and least weasel can be found in alpine areas hunting shrews, rodents, birds and insects.

Birds that nest or rear young in alpine habitats include rock and white-tailed ptarmigan, lesser golden plover, rosy crowned finch, water pipit, snow bunting, Savannah sparrow, horned lark and Lapland larkspur. Golden eagle, rough-legged hawk, gyrfalcon, northern harrier, long-tailed jaeger, snowy owl and common raven hunt tundra rodents and/or nesting birds. Although in fall many alpine wildlife species hibernate or leave tundra communities to avoid harsh winter conditions, during the summer these communities support a productive and unique fauna.

Saltwater Wetlands

Three general kinds of saltwater wetlands occur along Cook Inlet in the Yentna Area: sedge-dominated tidal marshes, *Elymus*-dominated grasslands and *Myrica*-dominated low shrublands. These areas are dominated by the very poorly drained Clunie soils and areas of Tidal Marsh. These productive environments are linked to adjacent estuaries, near shore coastal areas, and freshwater wetlands by freshwater runoff, tidal currents and movements of animals.

Low shrublands are farthest inland and may receive tidal influence only seasonally or during storms. Coastal shrublands generally support many wildlife species found in other low shrublands, including moose, hare, a variety of voles and lemmings, wide-ranging predators such as red fox, coyote and lynx and shrubland birds, particularly sparrows.

Elymus grasslands and tidal marshes provide succulent aquatic vegetation for moose and muskrat, but perhaps their greatest value is as staging and nesting areas for waterfowl. A variety of ducks and geese gather on Susitna Flats and along Rading Bay during migration. These environments provide high-energy foods when waterfowl may need them most; and accumulated seeds in the fall to fuel southward migration and tender new growth in spring as birds travel north behind melting snows to breeding grounds. Migratory species found in these wetlands include trumpeter swan, snow goose, Canada goose (including cackling Canada goose), the rare tule white-fronted goose and a variety of ducks and shorebirds. Pintail, mallard, widgeon, shoveler, green-winged teal and other waterfowl species may nest in these habitats. Thousands of waterfowl are harvested from Trading Bay and Susitna Flats annually. Fur bearers such as muskrat, mink and otter can also be found. In addition, these communities add detritus to estuarine and marine environments, thus contributing to aquatic food chains on which many invertebrates and fishes, including salmon, are dependent.

Freshwater Aquatic Habitats

Freshwater habitats such as streams, rivers, ponds and lakes are directly influenced by vegetation on shores and adjacent uplands. These aquatic habitats are important to a variety of fishes, both anadromous species (e.g., chinook, sockeye, coho, pink and chum salmon, steelhead trout, and Dolly Varden) and freshwater species (e.g., rainbow trout, nonanadromous Dolly Varden, lake trout, grayling, northern pike, burbot, and whitefish). Nearly every clearwater stream in the study area provides important salmon spawning habitat. Most streams, including glacial waters, provide migration routes for adults and juveniles of both anadromous and nonanadromous species. Most area lakes support one or more species of nonanadromous fish. Sport and subsistence fisheries in the area support thousands of days of fishing.

Aquatic habitats also support a variety of birds and some mammals. Bird species commonly breeding in or around lakes and ponds include common and red-throated loon, horned and red-necked grebe, gulls, Arctic tern, scoters, trumpeter swan and a variety of ducks. Common breeding birds along streams and rivers include bald eagle, belted kingfisher, dipper, spotted sandpiper and harlequin duck. Moose, beaver, muskrat, river otter, mink and other mammals hunt to feed in aquatic habitats seasonally or year-round.

Engineering

This section provides information for planning land uses related to urban development and water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, and construction materials. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section (page 73).

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, site selection, and design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data was collected about mineralogy of the sand and silt fractions and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, pipelines, and underground cables; evaluate alternative sites for sanitary landfills; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the glossary (page 111).

Building Site Development

Table 7 shows the degree and kind of soil limitations that affect shallow excavations, dwellings without basements, small commercial buildings, and local roads and streets. The limitations are considered *slight* if soil properties and site features generally are favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies

may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, a very firm dense layer, stone content, soil texture, and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and depth to the water table.

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrinking and swelling, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills generally are limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, potential for frost action, and depth to a high water table affect the traffic-supporting capacity.

Sanitary Facilities

Table 7 shows the degree and the kind of soil limitations that affect sanitary landfills. It also shows the suitability of the soils for use as a daily cover for landfill. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. Ease of excavation and revegetation should be considered.

The ratings in Table 7 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, and soil reaction affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Construction Materials

Table 8 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is excavated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing

engineering index properties provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel, or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have one or more of the following characteristics: a plasticity index of more than 10, many stones, slopes of more than 25 percent, or a water table at a depth of less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In Table 8, only the probability of finding material in suitable quantity in or below the soil is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is as much as 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments and bedrock.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel or stones, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy, have less than 20 inches of suitable material, have a large amount of gravel or stones, have slopes of more than 15 percent, or have a seasonal high water table at or near the surface.

The surface layer of most soils generally is preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features listed in tables are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics. These results are reported in Table 9.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 9 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under “Soil Series, Higher Taxa, and Their Morphology” (page 79).

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the glossary (page 111).

Classification of the soils is determined according to the AASHTO system adopted by the American Association of State Highway and Transportation Officials *(1982)* and the Unified soil classification system *(American Society for Testing and Materials, 1988)*.

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty soils as ML, CL, OL, MH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

Rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively.

Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas, and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas, and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 10 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given in the series descriptions in this survey.

Clay as a soil separate, or component, consists of mineral soil particles that are less than 0.002 millimeters in diameter. The estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earth-moving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3-bar moisture tension. Weight is determined after drying the soil at 105 °C. In Table 10, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data is used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The classes are *low*, a change of less than 3 percent; and *moderate*, 3 to 6 percent.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion. Factor K is one of six

factors used in the Universal Soil Loss Equation (USLE) to predict the average rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, very fine sand, sand, and organic matter (as much as 4 percent) and on soil structure and permeability. The estimates are modified by the presence of rock fragments. Values of K range from 0.02 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion.

Erosion factor T is an estimate of the maximum average rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their resistance to wind erosion in cultivated areas. The groups indicate the susceptibility of soil to wind erosion. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are as follows:

1. *1 to 9 percent dry soil aggregates.* These soils are very highly erodible. Crops can be grown if intensive measures to control wind erosion are used.
2. *10 to 24 percent dry soil aggregates.* These soils are highly erodible. Crops can be grown if intensive measures to control wind erosion are used.
3. *25 to 39 percent dry soil aggregates.* These soils are erodible. Crops can be grown if intensive measures to control wind erosion are used.
4. *25 to 39 percent dry soil aggregates with > 35 percent clay or > 5 percent calcium carbonate.* These soils are moderately erodible. Crops can be grown if measures to control wind erosion are used.
5. *40 to 44 percent dry soil aggregates.* These soils are slightly erodible. Crops can be grown if measures to control wind erosion are used.
6. 45 to 49 percent dry soil aggregates. These soils are very slightly erodible. Crops can easily be grown.
7. *50 percent or more dry soil aggregates.* These soils are very slightly erodible. Crops can easily be grown.
8. *Stony, gravelly, or wet soils and other soils not subject to wind erosion.*

Organic matter is the plant and animal residue in the soil at various stages of decomposition.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Water Features

Table 11 gives estimates of several important water features used in land use planning that involves engineering considerations. These features are described in the following paragraphs.

Hydrologic soil groups are groups of soils that, when saturated, have the same runoff potential under similar storm and ground cover conditions. The soil properties that affect the runoff potential are those that influence the minimum rate of infiltration in a bare soil after prolonged wetting, and when the soil is not frozen. These properties include the depth to a seasonal high water table, the intake rate, permeability after prolonged wetting, and the depth to a very slowly permeable layer. The influences of ground cover and slope are treated independently and are not taken into account in hydrologic soil groups.

In the definitions of the hydrologic soil groups, the infiltration rate is the rate at which water enters the soil at the surface and is controlled by surface conditions. The transmission rate is the rate at which water moves through the soil and is controlled by properties of the soil layers.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist chiefly of very deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well or well drained soils that have a moderately fine to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils that have a moderately fine or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of soils that have a permanent high water table and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to two hydrologic groups in Table 11, the first letter is for drained areas and the second is for undrained areas.

Flooding, the temporary covering of the soil surface by flowing water, is caused by overflow from

streams or by runoff from adjacent slopes. Shallow water standing or flowing for short periods after rainfall or snowmelt is not considered flooding. Standing water in marshes and swamps or in closed depressions is considered to be ponding.

Table 11 gives the frequency and duration of flooding and the time of year when flooding is most likely to occur.

Frequency, duration, and probable dates of occurrence are estimated. Frequency generally is expressed as none, rare, occasional, or frequent. *None* means flooding is not probable; *rare* that it is unlikely but is possible under unusual weather conditions (the chance of flooding is nearly 0 to 5 percent in any year); *occasional* that it occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year); and *frequent* that it occurs often under normal weather conditions (the chance of flooding is 50 percent in any year). The term *common* includes both frequent and occasional flooding.

Duration is expressed as *very brief* (less than 2 days), *brief* (2 to 7 days), *long* (7 to 30 days), and *very long* (more than 30 days). The time of year that flooding is most likely to occur is expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information on flooding is based on evidence in the soil profile, namely, thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and level of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The estimates are based mainly on observations of the water table at selected sites and on the evidence of a saturated zone, namely grayish colors or mottles (redoximorphic features) in the soil. Indicated in Table 11 are the depth to the seasonal high water table; the kind of water table —that is, perched, apparent, or artesian; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in Table 11.

An *apparent* water table is indicated by the level at which water stands in a freshly dug, unlined borehole after adequate time for adjustments in the surrounding soil.

A *perched* water table is one that is above an unsaturated zone in the soil. The basis for determining that a water table is perched may be general knowledge of the area. The water table is proven to be perched if the water level in a borehole is observed to fall when the borehole is extended.

An *artesian* water table is under hydrostatic head.

Two numbers in the column showing depth to the water table indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. "More than 6.0," indicates that the water table is below a depth of 6 feet or that it is within a depth of 6 feet for less than a month.

Soil Features

Table 12 gives estimates of several important soil features used in land use planning that involves engineering considerations. These features are described in the following paragraphs.

Depth to bedrock is given if bedrock is within a depth of 60 inches. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Subsidence is the settlement of organic soils or of saturated mineral soils of very low density. Subsidence generally results from either desiccation and shrinkage or oxidation of organic material, or both, following drainage. Subsidence takes place gradually, usually over a period of several years. Table 12 shows the expected initial subsidence, which usually is a result of drainage, and total subsidence, which results from a combination of factors.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heaves) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy

soils are the least susceptible. Frost heaves and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

A *low* potential for frost action indicates that the soil is rarely susceptible to the formation of ice lenses; a *moderate* potential indicates that the soil is susceptible to formation of ice lenses, resulting in frost heaves and the subsequent loss of soil strength; and a *high* potential indicates that the soil is highly susceptible to formation of ice lenses, resulting in frost heaves and the subsequent loss of soil strength.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil.

Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low, moderate,* or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low, moderate,* or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(United States Department of Agriculture, 1975)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field, or inferred from those observations, or from laboratory measurements. Table 13 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Eleven soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Entisol.

SUBORDER. Each order is divided into suborders, primarily on the basis of properties that influence soil genesis and are important to plant growth, or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquent (*Aqu*, meaning water, plus *ent*, from Entisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Cryaquents (*Cry*, meaning cold, plus *aquent*, the suborder of the Entisols that has an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Cryaquents.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, thickness of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is coarse-loamy, mixed, acid, Typic Cryaquents.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer, or of the substratum, can differ within a series. The Hiline series is an example of the coarse-loamy, mixed, acid family of Typic Cryaquents.

Soil Series, Higher Taxa, and Their Morphology

In this section, each soil series or higher taxa recognized in the survey area is described. Characteristics of the soil and the material in which it formed are identified for each soil series or higher taxa. A pedon, a small three-dimensional area of soil that is typical of the soil in the survey area, is described. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" *(Soil Survey Staff, 1993)*. Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" *(United States Department of Agriculture, 1975)*, and in "Keys to Soil Taxonomy" *(Soil Survey Staff, 1994)*. Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section “Detailed Soil Map Units” (page 6).

Chedatna Series

Taxonomic class: medial over sandy or sandy-skeletal, mixed Andic Cryochrepts
Depth class: very deep
Drainage class: well drained
Permeability: in the loess mantle—moderate; in the sandy underlying material—rapid
Position on landscape: alluvial terraces, on primary streams
Parent material: ash-influenced loess over sand
Slope range: 0 to 2 percent
Elevation: 50 to 500 feet (15 to 152 m)
Precipitation: 28 inches (71 cm)
Air temperature: 32 °F (0 °C)

Typical Pedon

Oe—2 inches to 0 (5 cm to 0); partially decomposed forest litter; abrupt smooth boundary
E—0 to 1 inch (0 to 3 cm); gray (10YR 5/1) silt loam; weak fine granular structure; very friable; many fine and common medium roots; very strongly acid; abrupt smooth boundary
Bw—1 to 3 inches (3 to 8 cm); dark yellowish brown (10YR 3/4) silt loam; weak medium granular structure; very friable; common medium distinct patches of dark brown (7.5YR 4/4); many fine and common medium roots; strongly acid; clear smooth boundary
BC—3 to 9 inches (8 to 23 cm); dark grayish brown (2.5Y 4/2) very fine sandy loam stratified with silt loam; weak medium granular structure; very friable; common medium distinct patches of yellowish brown (10YR 5/6); many fine and few medium roots; moderately acid; clear smooth boundary
C1—9 to 19 inches (23 to 48 cm); dark grayish brown (2.5Y 4/2) very fine sandy loam; massive; very friable; common fine roots; moderately acid; abrupt smooth boundary.
2C2—19 to 60 inches (48 to 150 cm); dark grayish brown (2.5Y 4/2) sand; single grain; loose; moderately acid

Typical Pedon Location

Map unit in which located: 202—Chedatna silt loam, 0 to 2 percent slopes
Location in survey area: about 900 feet (274 m) south and 1000 feet (304 m) east of the NW corner of sec. 29, T. 16 N., R. 7 W., Seward Meridian

Range in Characteristics

Profile feature: depth to sandy underlying material—14 to 20 inches (35 to 50 cm)
Organic layer: thickness—2 to 4 inches (5 to 10 cm)

E horizon:
Color—value moist of 4 or 5; chroma moist of 1 or 2
Reaction—very strongly to moderately acid

B horizon:
Color—hue of 5YR to 10YR; value moist of 3 to 5; chroma moist of 2 to 4
Texture—dominantly silt loam, but includes loam and very fine sandy loam
Reaction—very strongly to moderately acid

C horizon:
Color—hue of 10YR, 2.5Y; value moist of 3 to 6; chroma moist of 1 to 4

2C horizon:
Color—hue of 10YR, 2.5Y; value moist of 3 to 6; chroma moist of 1 to 4
Texture—sand or loamy sand with thin strata of sandy loam
Rock fragments—0 to 35 percent; gravel content—0 to 25 percent; cobble content—0 to 5 percent
Reaction—very strongly to moderately acid

Chichantna Series

Taxonomic class: Euic Fluvaquentic Borosaprists
Depth class: very deep
Drainage class: very poorly drained
Permeability: rapid
Position on landscape: muskegs and depressional areas
Parent material: peat deposits interlayered with ash-influenced loess
Slope range: 0 to 8 percent
Elevation: 50 to 2000 feet (15 to 609 m)
Precipitation: 28 inches (71 cm)
Air temperature: 32 °F (0 °C)

Typical Pedon

Oi—0 to 6 inches (0 to 15 cm); dark reddish brown (5YR 2.5/2) peat; about 85 percent fibers, less than 75 percent rubbed; few fine and medium sedge and shrub roots; strongly acid; gradual wavy boundary
Oe—6 to 15 inches (15 to 38 cm); dark reddish brown (5YR 3/3) mucky peat; about 75 percent fibers, less than 40 percent rubbed; few fine shrub roots; moderately acid; abrupt smooth

boundary
C—15 to 16 inches (38 to 40 cm); light olive brown (2.5Y 5/4) fine sandy loam; massive; friable; moderately acid; abrupt smooth boundary
Oa1—16 to 28 inches (40 to 70 cm); dark reddish brown (5YR 3/2) muck; reddish brown (5YR 3/3) squeezed; about 30 percent fibers; less than 15 percent rubbed; moderately acid; abrupt smooth boundary
C—28 to 35 inches (70 to 88 cm); olive yellow (2.5Y 6/6) loam; massive; friable; moderately acid; abrupt smooth boundary
Oa2—35 to 64 inches (88 to 160 cm); dark reddish brown (5YR 3/2) muck; reddish brown (5YR 3/3) squeezed; about 30 percent fibers, less than 10 percent rubbed; moderately acid

Typical Pedon Location

Map unit in which located: 203—Chichantna peat, 0 to 8 percent slopes
Location in survey area: about 1500 feet (457 m) east and 500 feet (152 m) south of the NW corner of sec. 1, T. 17 N., R. 10 W., Seward Meridian

Range in Characteristics

Profile feature: water table at or near the surface, except on the steeper slopes, where it may be 8 to 16 inches (20 to 40 cm) below the surface; thin layers of ash less than 10 inches (25 cm) thick (Figure 12)

O horizon:
Color—hue of 5YR, 7.5YR, 10YR; value moist of 2 or 3; chroma moist of 1 to 4
Texture—peat, mucky peat, muck
Reaction—strongly to slightly acid

C horizon:
Color—hue of 10YR, 2.5Y, 5Y; value moist of 3 to 6; chroma moist of 1 to 4
Texture—fine sandy loam, loam
Reaction—strongly to slightly acid

Chuit Series

Taxonomic class: medial over loamy, mixed Andic Humicryods
Depth class: very deep
Drainage class: well drained
Permeability: in the loess mantle—moderate; in the glacial till substratum—moderately slow
Position on landscape: mountain sideslopes
Parent material: ash-influenced loess deposited over massive, firm glacial till
Slope range: 2 to 45 percent
Elevation: 1000 to 5000 feet (304 to 1524 m)
Precipitation: 28 inches (71 cm)
Air temperature: 30 °F (-1 °C)

Typical Pedon

Oi—3 inches to 0 (8 cm to 0); mat of slightly decomposed litter from alpine tundra vegetation; abrupt smooth boundary
A—0 to 1 inch (0 to 3 cm); dark brown (10YR 3/3) silt loam; weak fine granular structure; very friable; many fine roots; strongly acid; abrupt broken boundary
Bhs1—1 to 4 inches (3 to 10 cm); black (10YR 2/1) silt loam; weak fine subangular blocky structure; very friable; smeary; few fine roots; pockets of dark brown (10YR 3/3); strongly acid; clear broken boundary
Bhs2—4 to 7 inches (10 to 18 cm); very dark brown (10YR 2/2) silt loam; weak fine granular structure; very friable; slightly smeary; few fine roots; pockets of black (10YR 2/1) due to frost churning; strongly acid; clear broken boundary
Bhs3—7 to 9 inches (18 to 23 cm); very dark brown (10YR 2/2) silt loam; weak fine subangular blocky structure; very friable; slightly smeary; few fine roots; pockets of dark brown (10YR 3/3) and yellowish brown (10YR 5/4) due to frost churning; strongly acid; clear broken boundary
Bs—9 to 17 inches (23 to 43 cm); yellowish brown (10YR 5/4) silt loam; weak fine subangular blocky structure; very friable; few fine roots; pockets of very dark brown (10YR 2/2) due to frost churning; strongly acid; clear wavy boundary
Ab—17 to 20 inches (43 to 50 cm); dark brown (7.5YR 3/2) silt loam; weak fine subangular blocky structure; very friable; strongly acid; clear wavy boundary
Bsb—20 to 24 inches (50 to 60 cm); dark brown (10YR 3/3) silt loam; weak fine subangular blocky structure; very friable; slightly smeary; 1/4 inch thick yellowish brown (10YR 5/4) ash layer; strongly acid; clear wavy boundary
C—24 to 33 inches (60 to 83 cm); dark brown (10YR 3/3) silt loam; massive; very friable; strongly acid; clear wavy boundary (0 to 9 inches thick)
2C—33 to 60 inches (83 to 150 cm); yellowish brown (10YR 5/8) gravelly silt loam; firm; 15 percent gravel; strongly acid

Typical Pedon Location

Map unit in which located: 206—Chuit and Nakochna silt loams, 3 to 30 percent slopes
Location in survey area: in the NW1/4, SW1/4 of

sec. 25, T. 13 N., R. 14 W., Seward Meridian

Range in Characteristics

Profile feature: depth to firm glacial till substratum—14 to 38 inches (35 to 96 cm)
Organic layer: thickness—0 to 4 inches (0 to 10 cm)

A horizon:
Color—hue of 5YR, 7.5YR, 10YR; value moist of 2 to 4; chroma moist of 1 to 3
Consistence—friable
Reaction—very strongly or strongly acid

Bhs horizon:
Color—hue of 5YR, 7.5YR, 10YR; value moist of 2 or 3; chroma moist of 1 or 2
Texture—silt loam or very fine sandy loam
Reaction—very strongly or strongly acid

B horizon:
Color—hue of 5YR, 7.5YR, 10YR; value moist of 3 to 5; chroma moist of 3 to 8
Consistence—friable
Reaction—very strongly or strongly acid

C horizon:
Color—hue of 7.5YR, 10YR; value moist of 3 to 5; chroma moist of 2 to 8
Reaction—very strongly or strongly acid

2C horizon:
Color—olive, gray, yellowish brown
Texture—silt loam, loam
Rock fragment—5 to 35 percent; gravel content—5 to 25 percent; cobble content—0 to 10 percent
Consistence—firm
Reaction—very strongly or strongly acid

Clunie

Taxonomic class: loamy, mixed, euic Terric Borofibrists
Depth class: very deep (more than 60 inches or 150 cm)
Drainage class: very poorly drained
Permeability: in the organic materials—rapid; in the underlying tidal material—very slow
Position on landscape: tidal flats
Parent material: coarse peat overlying loamy tidal sediments
Slope range: 0 to 2 percent
Elevation: 0 to 50 feet (0 to 15 m)
Precipitation: 28 inches (71 cm)
Air temperature: 32 °F (0 °C)

Typical Pedon

Oi1—0 to 3 inches (0 cm to 8); raw moss and sedge peat; many fine and medium roots; very strongly acid; clear smooth boundary
Oi2—3 to 11 inches (8 to 28 cm); yellowish brown (10YR 5/4) sphagnum moss and sedge peat; 90 percent fiber rubbed; few woody fragments; very strongly acid; clear smooth boundary
Oi3—11 to 33 inches (28 to 83 cm); dark grayish brown (10YR 4/2) sphagnum moss peat with sedge peat; few woody fragments; very strongly acid; abrupt smooth boundary
2C—33 to 63 inches (83 to 158 cm); dark gray (N 4/0) silty clay loam; 5 percent decomposed organic matter in strata; massive; firm; few fine roots; neutral

Typical Pedon Location

Map unit in which located: 207—Clunie peat, 0 to 2 percent slopes
Location in survey area: in the SW1/4, SW1/4 of sec. 31, T. 8 N., R. 15 W., Seward Meridian

Range in Characteristics

Profile feature: depth to mineral soil material—24 to 40 inches (61 to 100 cm)

O horizon:
Color—hue of 5YR, 7.5YR, 10YR; value moist of 2 to 5; chroma moist of 2 to 4
Texture—peat derived from mosses and sedges
Reaction—strongly acid to neutral

2C horizon:
Color—hue of 5Y to 5BG; value moist of 4 to 6; chroma moist of 0 or 1
Texture—silty clay loam, silt loam with strata of very fine sand and very fine sandy loam
Reaction—moderately acid to neutral

Cryaquents

Taxonomic class: Cryaquents
Depth class: very deep (more than 60 inches or 150 cm)
Drainage class: very poorly drained
Permeability: very slow to moderate
Position on landscape: tidal flats
Parent material: stratified silty and loamy tidal sediments
Slope range: 0 to 2 percent
Elevation: 0 to 50 feet (0 to 15 m)
Precipitation: 28 inches (71 cm)

Air temperature: 32 °F (0 °C)

Typical Pedon

Oe—4 inches to 0 (10 cm to 0); mat of (10YR 4/2) moderately decomposed sedges and moss; abrupt smooth boundary
C1—0 to 20 inches (0 to 50 cm); dark gray (N 4/0) silt loam, with fine strata of loam and silty clay loam; massive; friable; many fine roots; neutral; gradual wavy boundary
C2—20 to 60 inches (50 to 150 cm); dark gray (N 4/0) silty clay loam, with strata of loam and silt loam; massive; friable; few fine roots in the upper part; neutral

Typical Pedon Location

Map unit in which located: 209—Cryaquents, Tidal
Location in survey area: in the NW1/4, NW1/4 of sec. 19, T. 13 N., R. 9 W., Seward Meridian

Range in Characteristics

Depth to water table: 0 to 6 inches (0 to 15 cm)
Organic layer: thickness—2 to 6 inches (5 to 15 cm)

C horizon:
Color—hue of 2.5Y, 5Y; value moist of 4 to 7; chroma moist of 0 or 1
Texture—stratified mineral material ranging from sandy loam to silty clay loam with thin peat layers
Reaction—neutral

Cryorthents

Taxonomic class: Cryorthents
Depth class: very deep (more than 60 inches or 150 cm)
Drainage class: well drained
Permeability: moderately slow
Position on landscape: escarpments on moraines, drumlins and mountains sideslopes
Parent material: firm glacial till
Slope range: 35 to 45 percent
Elevation: 50 to 1500 feet (15 to 457 m)
Precipitation: 28 inches (71 cm)
Air temperature: 32 °F (0 °C)

Typical Pedon

Oi—1 inch to 0 (2 cm to 0); mat of slightly decomposed shrub litter; abrupt smooth boundary
A—0 to 1 inch (0 to 2 cm); dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; common fine roots; very strongly acid; abrupt wavy boundary
2C—1 to 60 inches (2 to 150 cm); olive brown (2.5YR 4/4) gravelly silt loam; massive; firm; 15 percent gravel, 5 percent cobbles; strongly acid

Typical Pedon Location

Map unit in which located: 216—Kroto-Strandline-Cryorthents complex, 30 to 45 percent slopes
Location in survey area: in the NE1/4, SE1/4 of sec. 33, T. 25 N., R. 8 W., Seward Meridian

Range in Characteristics

Organic layer: thickness—1 to 3 inches (2 to 7 cm)

A horizon:
Color—hue of 5YR to 10YR; value moist of 2 or 3; chroma moist of 1 or 2
Reaction—strongly to very strongly acid

2C horizon:
Texture—loam or silt loam
Rock fragment—5 to 35 percent; gravel content—5 to 25 percent; cobble content—0 to 5 percent
Reaction—slightly to strongly acid

Doroshin Series

Taxonomic class: loamy, mixed, euic Terric Borohemists
Depth class: very deep (more than 60 inches or 150 cm)
Drainage class: very poorly drained
Permeability: in the organic material—rapid; in the mineral substratum—moderate
Position on landscape: muskegs
Parent material: peat deposits over silty mineral deposits
Slope range: 0 to 5 percent
Elevation: 50 to 1500 feet (15 to 457 m)
Precipitation: 28 inches (71 cm)
Air temperature: 32 °F (0 °C)

Typical Pedon

Oi—0 to 2 inches (0 to 5 cm); black (5YR 2.5/1) moss and sedge peat; very strongly acid; abrupt smooth boundary
Oa—2 to 6 inches (5 to 15 cm); dark reddish brown (5YR 3/2) muck; very strongly acid; clear smooth boundary
Oe1—6 to 25 inches (15 to 63 cm); dark reddish brown (5YR 3/2) mucky peat; very strongly acid; abrupt smooth boundary
2C1—25 to 32 inches (63 to 80 cm); yellowish brown

(10YR 5/4) loam; massive; friable; strongly acid; abrupt smooth boundary
2C2—32 to 60 inches (80 to 150 cm); light gray (5Y 7/1) loam; massive; friable; strongly acid; clear smooth boundary

Typical Pedon Location

Map unit in which located: 208—Doroshin peat, 0 to 5 percent slopes
Location in survey area: in the SW1/4, SE1/4 of sec. 6, T. 23 N., R. 13 W., Seward Meridian

Range in Characteristics

Profile feature: depth to thick mineral layer—16 to 48 inches (40 to 120 cm)
Depth to water table: at or near the surface

O horizon:
Color—hue of 5YR, 7.5YR, 10YR; value moist of 2 to 4; chroma moist of 2 to 4
Reaction—very strongly or strongly acid

2C horizon:
Color—hue of 7.5YR, 10YR, 2.5Y 5Y; value moist of 3 to 7; chroma moist of 1 to 4
Texture—silt loam, loam, sandy loam and may include strata of volcanic ash
Rock fragment—0 to 25 percent; gravel content—0 to 25 percent
Reaction—very strongly or strongly acid

Hewitt Series

Taxonomic class: loamy, mixed, euic Terric Borohemists
Depth class: very deep (more than 60 inches or 150 cm)
Drainage class: very poorly drained
Permeability: in the organic materials—rapid; in the mineral substratum—slow
Position on landscape: muskegs on floodplains
Parent material: peat over silty alluvium
Slope range: 0 to 2 percent
Elevation: 25 to 1000 feet (7 to 304 m)
Precipitation: 28 inches (71 cm)
Air temperature: 32 °F (0 °C)

Typical Pedon

Oi—0 to 4 inches (0 to 10 cm); dark yellowish brown (10YR 4/4) peat; yellowish brown (10YR 5/6), squeezed; many dark brown (10YR 3/3) patches with no change in color when squeezed; about 80 percent fiber, less than 60 percent rubbed; many roots; dominantly moss peat with sedge peat; slightly acid; clear smooth boundary
Oe—4 to 7 inches (10 to 18 cm); dark brown (10YR 3/3) mucky peat; no change in color when squeezed; about 50 percent fiber, less than 30 percent rubbed; common roots; dominantly moss peat; neutral; abrupt smooth boundary
C—7 to 12 inches (18 to 30 cm); dark greenish gray (5GY 4/1) silty clay loam; massive; firm; slightly sticky, slightly plastic; contains layer of dark brown peat about 1" thick with less than 30 percent fiber; few roots; neutral; abrupt smooth boundary
Oe1—12 to 27 inches (30 to 68 cm); very dark grayish brown (10YR 3/2) mucky peat; no change in color when pressed; about 50 percent fiber, 25 percent when rubbed; derived mainly from sedges and moss; few roots; neutral; abrupt smooth boundary
Oe2—27 to 33 inches (68 to 83 cm); very dark grayish brown (10YR 3/2) mucky peat; no change in color when pressed; about 50 percent fiber, 25 percent rubbed; derived mainly from sedges and roots; strata 1/2 to 1 inch thick of dark greenish gray (5GY 4/1) silt loam making up 30 percent of the volume; mineral material is massive, nonsticky, nonplastic; neutral; abrupt smooth boundary
C—33 to 60 inches (83 to 150 cm); dark gray (5Y 4/1) silt loam; massive; firm; nonsticky, nonplastic; contains few thin discontinuous strata of brown peat

Typical Pedon Location

Map unit in which located: 211—Hewitt peat, 0 to 2 percent slopes
Location in survey area: in the SW1/4, NW1/4 of sec. 25, T. 22 N., R. 11 W., Seward Meridian

Range in Characteristics

Profile feature: depth to continuous underlying mineral material—25 to 50 inches (63 to 127 cm); mineral strata are present on the surface in some pedons; coarse woody fragments may be present in the subsurface tier in some pedons
Depth to water table: 0 to 6 inches (0 to 15 cm)

O horizon:
Color—hue of 5YR, 7.5YR, 10YR; value moist of 2 or 3; chroma moist of 1 to 4
Texture—peat derived from sedges, mosses and shrubs
Coarse woody fragments—0 to 10 percent in the subsurface tier

Reaction—strongly acid to neutral

C horizon:
Color—hue of 2.5Y, 5Y, 5GY; value moist of 5 to 7; chroma moist of 0 or 1
Texture—silt loam, silty clay loam

Hiline Series

Taxonomic class: coarse-loamy, mixed, acid Typic Cryaquents
Depth class: very deep
Drainage class: very poorly drained
Permeability: in the loamy material—moderate; in the sandy and gravelly underlying material—rapid
Position on landscape: floodplains and stream terraces
Parent material: alluvium
Slope range: 0 to 2 percent
Elevation: 50 to 100 feet (15 to 30 m)
Precipitation: 28 inches (71 cm)
Air temperature: 32 °F (0 °C)

Typical Pedon

Oi—2 inches to 0 (5 cm to 0); very dark brown (10YR 2/2) mat of decomposing roots and grasses; very strongly acid; abrupt smooth boundary
A—0 to 3 inches (0 to 8 cm); dark gray (N 4/1) silt loam; weak fine granular; structure; friable; very strongly acid; clear smooth boundary
C1—3 to 31 inches (8 to 78 cm); gray (10YR 5/1) fine sandy loam; friable; common fine distinct strong brown (7.5YR 4/6) mottles; strongly acid; clear smooth boundary
C2—31 to 41 inches (78 to 103 cm); gray (10YR 5/1) silt loam; massive; friable; common fine distinct strong brown (7.5YR 4/6) mottles; strongly acid; clear smooth boundary
2C—41 to 60 inches (103 to 150 cm); grayish brown (10YR 5/2) gravelly sand; 20 percent gravel and 5 percent cobbles by volume; loose; strongly acid

Typical Pedon Location

Map unit in which located: 214—Killey and Hiline silt loams, 0 to 2 percent slopes
Location in survey area: in the SW1/4, NE1/4 of sec. 32, T. 25 N., R. 9 W., Seward Meridian

Range in Characteristics

Depth to sandy and gravelly substratum: more than 40 inches (100 cm)
Depth to water table: 0 to 18 inches (0 to 45 cm) except in times of overflow and extremely wet periods
Organic layer: thickness—2 to 6 inches (5 to 15 cm)

A horizon:
Color—hue of 10YR or 2.5Y; value moist of 3 or 4; chroma moist of 1 or 2
Texture—silt loam stratified with fine sandy loam, sandy loam or loamy sand

C horizon:
Color—hue of 10YR, to 5Y; value moist of 4 or 5; chroma moist of 1 or 2
Texture—fine sandy loam with strata of silt loam and fine sand

2C horizon:
Color—hue of 10YR, to 5Y; value moist of 4 or 5; chroma moist of 1 or 2
Texture—stratified sand and gravel
Rock fragments—25 to 50 percent; gravel content—20 to 40 percent; cobble content—5 to 15 percent
Reaction—strongly acid

Histic Pergelic Cryaquepts

Taxonomic class: Histic Pergelic Cryaquepts
Depth class: very shallow to shallow (0 to 20 inches or 0 to 50 cm) to permafrost
Drainage class: very poorly drained
Permeability: above the permafrost—moderately rapid
Position on landscape: moraine and mountain footslopes
Parent material: loess over firm glacial till substratum
Slope range: 0 to 7 percent
Elevation: 200 to 900 (60 to 274 m)
Precipitation: 28 inches (71 cm)
Air temperature: 30 °F (-1 °C)

Typical Pedon

Oi—11 inches to 0 (28 cm to 0); peat; abrupt smooth boundary
Af—0 to 5 inches (0 to 13 cm); black (10YR 2/1) silt loam; frozen; strongly acid; abrupt smooth boundary
Bf—5 to 8 inches (13 to 20 cm); dark brown (10YR 3/3) silt loam; frozen; common coarse prominent black (10YR 2/1) mottles; strongly acid; abrupt smooth boundary
Cf1—8 to 14 inches (20 to 35 cm); brown (10YR 4/3) silt loam; frozen; strongly acid; abrupt smooth boundary
Abf—14 to 15 inches (35 to 38 cm); black (10YR

2/1) silt loam; frozen; strongly acid; abrupt smooth boundary
Cf2—15 to 17 inches (38 to 43 cm); brown (10YR 4/3) silt loam; frozen; strongly acid

Typical Pedon Location

Map unit in which located: 212—Histic Pergelic Cryaquepts - Starichkof complex, 0 to 7 percent slopes
Location in survey area: in the SW1/4, NW1/4 of sec. 33, T. 25 N., R. 12 W., Seward Meridian

Range in Characteristics

Profile feature: Some profiles contain buried horizons that are similar in color and texture to the upper solum.
Depth to permafrost: 0 to 20 inches (0 to 50 cm); profile is frozen to the surface of the mineral soil
Depth to mottles that have chroma of 2 or less: 0 to 5 inches (0 to 12 cm)

A horizon:
Color—hue of 5YR, 7.5YR, 10YR; value moist of 2 or 3; chroma moist of 1 or 2

B horizon:
Color—hue of 10YR, 2.5Y; value moist of 2 to 4; chroma moist of 2 to 4

C horizon:
Color—hue of 10YR, 2.5Y, 5Y; value moist of 4 to 6; chroma moist of 2 to 4
Texture—silt loam, very fine sandy loam, fine sandy loam, sandy loam
Reaction—very strongly or strongly acid

Homestead Series

Taxonomic class: Loamy-skeletal, mixed, Typic Haplocryods
Taxadjunct features: Control section is sandy-skeletal; spodic horizon is less than 7 inches (17 cm) thick. In this survey area these soils classify as sandy-skeletal, mixed Typic Haplocryods.
Depth class: very deep
Drainage class: well drained
Permeability: in the loess mantle—moderate; in the substratum—rapid
Position on landscape: outwash plains
Parent material: loess over alluvium
Slope range: 0 to 2 percent
Elevation: 50 to 500 feet (15 to 152 m)
Precipitation: 28 inches (71 cm)
Air temperature: 32 °F (0 °C)

Typical Pedon

Oe—2 inches to 0 (5 cm to 0); dark reddish brown (5YR 2/2) mat of moderately decomposing forest litter; abrupt smooth boundary
E—0 to 2 inches (0 to 5 cm); dark gray brown (10YR 4/2) silt loam; weak fine granular structure; very friable; strongly acid; abrupt smooth boundary
Bs1—2 to 3 inches (5 to 8 cm); dark brown (7.5YR 4/4) silt loam; weak fine granular structure; very friable; strongly acid; abrupt smooth boundary
Bs2—3 to 8 inches (8 to 20 cm); brown (7.5YR 5/4) silt loam; weak fine granular structure; very friable; moderately acid; abrupt smooth boundary
C3—8 to 40 inches (20 to 100 cm); brown (10YR 5/3) very gravelly medium sand; 30 percent gravel and 15 percent cobbles; single grain; loose; moderately acid; gradual wavy boundary
C3—40 to 60 inches (100 to 150 cm); brown (10YR 5/3) extremely gravelly medium sand; 40 percent gravel and 20 percent cobbles; single grain; loose; moderately acid

Typical Pedon Location

Map unit in which located: 213—Homestead silt loam, 0 to 2 percent slopes
Location in survey area: in the SE1/4, of sec. 3, T. 14 N., R. 12 W., Seward Meridian

Range in Characteristics

Depth to sandy and gravelly substratum: 4 to 10 inches (10 to 25 cm)
Organic layer: thickness—1 to 3 inches (2 to 7 cm)

E horizon:
Color—value moist of 4 or 5
Texture—silt loam or very fine sandy loam

Bs horizon:
Color—value moist of 4 or 5; chroma moist of 3 or 4

BC horizon:
Color—value moist of 5 or 6; chroma moist of 4 to 6
Texture—silt loam, includes stratas of sandy loam

2C horizon:
Color—hue of 10YR or 2.5Y; value moist of 4 to 6; chroma moist of 3 to 5
Texture—fine earth fraction is coarse, medium or fine sand, or loamy sand
Rock fragments—45 to 70 percent; gravel content—30 to 60 percent; cobble content—5 to 20 percent
Reaction—strongly acid to moderately acid throughout the profile

Taxadjunct Features

Map unit 213: Control section is sandy-skeletal; spodic horizon is less than 7 inches (17 cm) thick. In this survey area these soils classify as sandy-skeletal, mixed Typic Haplocryods.

Kashwitna Series

Taxonomic class: medial over sandy or sandy-skeletal, mixed Andic Haplocryods
Depth class: very deep
Drainage class: well drained
Permeability: in the loess mantle—moderate; in the sandy and gravelly substratum—rapid
Position on landscape: alluvial terraces
Parent material: ash-influenced loess overlying sandy and gravelly alluvium
Slope range: 0 to 45 percent
Elevation: 50 to 1500 feet (15 to 457 m)
Precipitation: 28 inches (71 cm)
Air temperature: 32 °F (0 °C)

Typical Pedon

Oi—3 inches to 0 (8 cm to 0); very dark brown (10YR 2/2) mat of decomposing forest litter, moss, mycelia, and fine roots; very strongly acid; abrupt wavy boundary
E—0 to 2 inches (0 to 5 cm); gray (10YR 5/1) silt loam; weak fine granular structure; very friable; many medium and coarse roots; very strongly acid; abrupt smooth boundary
Bs1—2 to 4 inches (5 to 10 cm); dark reddish brown (5YR 3/4) silt loam; weak fine subangular blocky structure; very friable; slightly smeary when rubbed; many medium and coarse roots; few fine iron concretions; very strongly acid; abrupt wavy boundary
Bs2—4 to 7 inches (10 to 18 cm); strong brown (7.5YR 4/6) silt loam; weak fine subangular blocky structure; very friable; slightly smeary when rubbed; many medium and coarse roots; very strongly acid; abrupt smooth boundary
Eb—7 to 9 inches (18 to 23 cm); very dark grayish brown (10YR 3/2) silt loam; weak fine granular structure; very friable; slightly smeary when rubbed; many medium and coarse roots; very strongly acid; abrupt smooth boundary
Bsb—9 to 15 inches (23 to 38 cm); dark brown (7.5YR 4/4) silt loam; weak fine subangular blocky structure; very friable; slightly smeary when rubbed; common coarse roots; strongly acid; clear wavy boundary
BC—15 to 18 inches (38 to 45 cm); dark yellowish brown (10YR 3/4) silt loam; weak fine subangular blocky structure; very friable; slightly smeary when rubbed; 10 percent coarse gravel; strongly acid; clear smooth boundary
2C—18 to 60 inches (45 to 150 cm); olive brown (2.5Y 4/4) very gravelly sand; single grain; loose; 45 percent coarse gravel; strongly acid

Typical Pedon Location

Map unit in which located: 218—Nancy-Kashwitna complex, 0 to 2 percent slopes
Location in survey area: in the SW1/4, NW1/4 of sec. 36, T. 12 N., R. 11 W., Seward Meridian

Range in Characteristics

Depth to gravelly substratum: 10 to 20 inches (25 to 50 cm)
Organic layer: thickness—2 to 5 inches (5 to 12 cm)

E horizon:
Color—hue of 5YR, 7.5YR, 10YR; value moist of 2 to 6; chroma moist of 1 or 2
Texture—dominantly silt loam, but some areas very fine sandy loam, or fine sandy loam
Consistence—very friable
Reaction—extremely to strongly acid

Bs horizon:
Color—hue of 2.5YR, 5YR, 7.5YR; value moist of 3 to 5; chroma moist of 3 to 6
Texture—silt loam, very fine sandy loam
Consistence—very friable
Reaction—very strongly or strongly acid
Other—The lower solum is usually similar to the surface solum in color and texture. However, in pedons where the lower solum extends into the underlying material, the hue ranges to 5Y, and the texture ranges to very gravelly sand.

2C horizon:
Color—variegated in color
Texture—The dominant texture is very gravelly sand, although thin layers of fine sand or sandy loam may be present in the upper part of the 2C material.
Rock fragments—35 to 50 percent; gravel content—35 to 50 percent; cobble content—0 to 10 percent
Consistence—loose
Reaction—very strongly or strongly acid

Killey Series

Taxonomic class: coarse-loamy over sandy or sandy-skeletal, mixed, acid Typic Cryaquents
Depth class: very deep

Drainage class: very poorly drained
Permeability: in the loamy material—moderate; in the sand and gravel—rapid
Position on landscape: floodplains
Parent material: stratified loamy alluvium over sandy and gravelly alluvium
Slope range: 0 to 2 percent
Elevation: 25 to 1500 feet (7 to 457 m)
Precipitation: 28 inches (71 cm)
Air temperature: 32 °F (0 °C)

Typical Pedon

Oi—3 inches to 0 (8 cm to 0); brown (10YR 4/3) mat of decomposing grass and roots; very strongly acid; abrupt smooth boundary
A1—0 to 4 inches (0 to 10 cm); brown (10YR 4/3) silt loam; weak fine granular structure; friable; very strongly acid; abrupt smooth boundary
A2—4 to 8 inches (10 to 20 cm); brown (10YR 4/3) silt loam; many fine distinct grayish brown (2.5Y 5/2) mottles; weak medium granular structure; friable; very strongly acid; abrupt smooth boundary
C1—8 to 22 inches (20 to 55 cm); gray (2.5Y N6) loam; many medium distinct dark brown (7.5YR 3/2) mottles; massive; friable; very strongly acid; clear smooth boundary
C2—22 to 38 inches (55 to 95 cm); light brownish gray (2.5Y 6/2) sand; single grain; loose; very strongly acid; clear smooth boundary
C3—38 to 63 inches (95 to 158 cm); olive (5Y 5/3) very gravelly sand; 40 percent gravel and 5 percent cobbles by volume; single grain; loose; very strongly acid

Typical Pedon Location

Map unit in which located: 214—Killey and Hiline silt loams, 0 to 2 percent slopes
Location in survey area: in the NE1/4, SE1/4 of sec. 1, T. 18 N., R. 12 W., Seward Meridian

Range in Characteristics

Depth to sandy and gravelly substratum: 20 to 40 inches (50 to 100 cm)
Depth to apparent water table: 0 to 18 inches (0 to 45 cm)
Organic layer: thickness—1 to 3 inches (2 to 7 cm)

A horizon:
Color—hue of 10YR; value moist of 3 or 4; chroma moist of 1 to 3
Texture—silt loam
Consistence—friable
Reaction—very strongly or strongly acid

C horizon:
Color—hue of 5Y, 2.5Y, 10YR; value moist of 3 to 8; chroma moist of 0 to 3
Texture—ranges from silt loam to coarse sand
Rock fragments—in the lower part, 35 to 60 percent; gravel content—35 to 55 percent; cobble content—0 to 5 percent
Reaction—very strongly or strongly acid

Kliskon Series

Taxonomic class: medial over loamy, mixed Andic Cryaquods
Depth class: very deep
Drainage class: poorly drained
Permeability: in the loess mantle—moderate; in the firm glacial till substratum—moderately slow
Position on landscape: mountain side slopes
Parent material: ash-influenced loess deposited over firm glacial till
Slope range: 2 to 12 percent
Elevation: 600 to 2000 feet (182 to 609 m)
Precipitation: 28 inches (71 cm)
Air temperature: 31 °F (-.5 °C)

Typical Pedon

Oe—3 inches to 0 (8 cm to 0); mat of roots and moderately decomposed grass litter, abrupt smooth boundary
E—0 to 2 inches (0 to 5 cm); dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable; many fine roots; very strongly acid; abrupt smooth boundary
Bhs—2 to 4 inches (5 to 10 cm); dark reddish brown (5YR 3/3) silt loam; weak medium subangular blocky structure; friable; many fine roots; very strongly acid; abrupt wavy boundary
Bs1—4 to 6 inches (10 to 15 cm); reddish brown (5YR 4/4) silt loam; moderate medium subangular blocky structure; friable; common fine roots; very strongly acid; clear wavy boundary
Bs2—6 to 10 inches (15 to 25 cm); brown (7.5YR 5/4) silt loam; weak medium subangular blocky structure; friable; slightly smeary; common medium distinct yellowish brown (7.5YR 5/8) and few fine distinct brownish yellow (10YR 6/8) mottles; common fine roots; strongly acid; clear smooth boundary
Bs3—10 to 19 inches (25 to 48 cm); dark yellowish brown (10YR 4/4) silt loam; weak coarse subangular blocky structure; friable; few fine distinct brownish yellow (10YR 6/8) mottles; few fine roots; strongly acid; clear smooth boundary

2C—19 to 60 inches (48 to 150 cm); olive brown (2.5YR 4/4) gravelly loam; massive; firm; many fine distinct yellowish brown (10YR 5/8) mottles; 15 percent gravel, 5 percent cobble; strongly acid

Typical Pedon Location

Map unit in which located: 215—Kliskon silt loam, 2 to 12 percent slopes
Location in survey area: about 2000 feet (609 m) east of the SW corner of sec. 20, T. 27 N., R. 12 W., Seward Meridian

Range in Characteristics

Profile feature: Buried B horizons, when present, are similar in color and texture.
Depth to firm glacial till substratum: 10 to 20 inches (25 to 50 cm)
Depth to water table: 18 to 30 inches (45 to 76 cm)
Organic layer: thickness—1 to 3 inches (2 to 7 cm)

E horizon:
Color—hue of 7.5YR, 10YR; value moist of 2 to 4; chroma moist of 1 or 2
Texture—dominantly silt loam, but some areas are very fine sandy loam
Consistence—friable
Reaction—extremely to strongly acid

B horizon:
Color—hue of 5YR to 10YR; value moist of 3 to 5; chroma moist of 1 to 4
Texture—silt loam, very fine sandy loam
Consistence—friable
Reaction—extremely to strongly acid

2C horizon:
Color—hue of 2.5Y or 5Y; value moist of 3 to 6; chroma moist of 2 to 4
Texture—loam, silt loam
Rock fragments—5 to 35 percent; gravel content—5 to 30 percent; cobble content—0 to 15 percent
Consistence—firm
Reaction—extremely to strongly acid

Kroto Series

Taxonomic class: medial over loamy, mixed Andic Haplocryods
Depth class: very deep
Drainage class: well drained
Permeability: in the loess mantle—moderate; in the glacial till substratum—moderately slow
Position on landscape: moraines, hills, and mountain footslopes
Parent material: ash-influenced loess overlying firm glacial till
Slope range: 1 to 45 percent
Elevation: 50 to 1500 feet (15 to 457 m)
Precipitation: 28 inches (71 cm)
Air temperature: 32 °F (0 °C)

Typical Pedon

Oe—3 inches to 0 (8 cm to 0); mat of roots and moderately decomposed forest litter
E—0 to 2 inches (0 to 5 cm); gray (10YR 6/1) silt loam; weak fine granular structure; very friable; many fine and medium roots; very strongly acid; abrupt wavy boundary
Bhs—2 to 4 inches (5 to 10 cm); dark reddish brown (5YR 3/3) silt loam; weak fine granular structure; very friable; many fine and medium roots; strongly acid; clear smooth boundary
Bs1—4 to 6 inches (10 to 15 cm); strong brown (7.5YR 5/6) silt loam; weak fine subangular blocky structure; very friable; few fine distinct patches of dark reddish brown (5Y 3/4); many fine and medium roots; strongly acid; gradual wavy boundary
Bs2—6 to 9 inches (15 to 23 cm); yellowish brown (10YR 5/6) silt loam; weak fine subangular blocky structure; very friable; many fine and medium roots; strongly acid; clear smooth boundary
Bs3—9 to 12 inches (23 to 30 cm); dark yellowish brown (10YR 4/4) silt loam; weak fine subangular blocky structure; very friable; common fine and medium roots; strongly acid; abrupt smooth boundary
Eb—12 to 14 inches (30 to 35 cm); grayish brown (2.5Y 5/2) silt loam; weak fine subangular blocky structure; very friable; common fine and medium roots; strongly acid; abrupt wavy boundary
Bsb—14 to 19 inches (35 to 48 cm); brown (7.5YR 4/4) silt loam; weak fine subangular blocky structure; very friable; few fine roots; strongly acid; clear smooth boundary
2C—19 to 60 inches (48 to 150 cm); olive brown (2.5Y 4/4) gravelly silt loam; massive; firm; 15 percent gravel, 5 percent cobble; strongly acid

Typical Pedon Location

Map unit in which located: 240—Strandline-Spenard-Kroto complex, 2 to 30 percent slopes
Location in survey area: in the SW1/4, SE1/4 of sec. 27, T. 26 N., R. 7 W., Seward Meridian

Range in Characteristics

Profile feature: C horizons below the buried solum

are present in some pedons; the buried solum is similar in color and texture to the upper solum.
Depth to firm glacial till substratum: 10 to 20 inches (25 to 50 cm)
Organic layer: thickness—1 to 4 inches (2 to 10 cm)

A horizon:
Color—hue of 7.5YR, 10YR, 2.5Y; value moist of 2 or 3; chroma moist of 1 or 2
Reaction—extremely to strongly acid

E horizon:
Color—hue of 7.5YR, 10YR, 2.5Y; value moist of 4 to 6; chroma moist of 1 or 2
Texture—silt loam, very fine sandy loam
Reaction—extremely to strongly acid

B horizon:
Color—hue of 5YR, 7.5YR, 10YR; value moist of 3 to 5; chroma moist of 1 to 6
Texture—silt loam, very fine sandy loam
Reaction—extremely to strongly acid

2C horizon:
Color—hue of 2.5Y or 5Y; value moist of 3 to 6; chroma moist of 1 to 4
Coarse fragments—5 to 35 percent; gravel content—5 to 30 percent; cobble content—0 to 5 percent
Consistence—firm

Lucile Series

Taxonomic class: medial over sandy or sandy-skeletal, mixed Andic Cryaquods
Depth class: very deep
Drainage class: poorly drained
Permeability: in the loess mantle—moderate; in the sand and gravel—rapid
Position on landscape: stream terraces
Parent material: ash-influenced loess over sandy and gravelly material
Slope range: 0 to 2 percent
Elevation: 50 to 1500 feet (15 to 457 m)
Precipitation: 28 inches (71 cm)
Air temperature: 32 °F (0 °C)

Typical Pedon

Oi—2 inches to 0 (5 cm to 0); mat of decomposing moss and forest litter; many fine and medium roots; abrupt smooth boundary
E—0 to 1 inches (0 to 3 cm); dark grayish brown (10YR 4/2) silt loam; moderate medium granular structure; friable; many fine and medium roots; strongly acid; abrupt smooth boundary
Bhs—1 to 4 inches (3 to 10 cm); very dark brown (10YR 4/4) silt loam; weak medium subangular blocky structure; friable; many fine and medium roots; moderately acid; abrupt smooth boundary
Bs1—4 to 9 inches (10 to 23 cm); dark reddish brown (5YR 3/3) silt loam; common medium distinct dark yellowish brown (10YR 3/2) mottles; moderate medium subangular blocky structure; friable; many fine and medium roots; moderately acid; abrupt smooth boundary
Bs2—9 to 16 inches (23 to 40 cm); dark yellowish brown (10YR 4/4) silt loam; common medium distinct yellowish red (10YR 4/6) and few large prominent brown (10YR 5/3) mottles; weak fine subangular blocky structure; friable; many fine and few medium roots; moderately acid; clear smooth boundary
C—16 to 26 inches (40 to 65 cm); light brownish gray (10YR 6/2) silt loam; massive; friable; many fine iron concretions; common fine roots; few gravel moderately acid; clear smooth boundary
2C—26 to 60 inches (65 to 150 cm); light brownish gray (10YR 6/2) gravelly sand; single grain; loose; few medium iron concretions; 25 percent gravel, moderately acid

Typical Pedon Location

Map unit in which located: 217—Lucile silt loam, 0 to 2 percent slopes
Location in survey area: in the NW1/4, SW1/4 of sec. 3, T. 11 N., R. 15 W., Seward Meridian

Range in Characteristics

Depth to sand and gravel substratum: 15 to 30 inches (38 to 76 cm)
Depth to water table: 18 to 30 inches (45 to 76 cm)
Organic layer: thickness—1 to 4 inches (2 to 10 cm)

A horizon:
Color—value moist of 2 or 3
Reaction—strongly or moderately acid

E horizon:
Color—hue of 7.5YR, 10YR; value moist of 4 or 5; chroma moist of 1 or 2
Reaction—strongly or moderately acid

B horizon:
Color—hue of 5YR 7.5YR, 10YR; value moist of 3 or 4; chroma moist of 2 to 6
Texture—dominantly silt loam, but some areas are very fine sandy loam
Reaction—strongly or moderately acid

C horizon:
Color—hue of 2.5YR 7.5YR, 10YR; value moist of 3 to 6; chroma moist of 2 to 6
Texture—dominantly silt loam, but some areas are very fine sandy loam
Reaction—strongly or moderately acid

2C horizon:
Color—hue of 10YR 2.5Y or 5Y; value moist of 4 to 6; chroma moist of 2 to 4
Texture—sand loamy sand, gravelly and cobbly sand
Rock fragments—25 to 50 percent; gravel content—20 to 40 percent; cobble content—5 to 10 percent
Reaction—strongly moderately acid

Nakochna Series

Taxonomic class: medial, Lithic Humicryods
Depth class: shallow (14 to 20 inches or 35 to 50 cm)
Drainage class: well drained
Permeability: in the loess mantle—moderate
Position on landscape: mountain side slopes and ridges
Parent material: ash-influenced loess, deposited over bedrock
Slope range: 2 to 45 percent
Elevation: 1000 to 5000 feet (304 to 1524 m)
Precipitation: 28 inches (71 cm)
Air temperature: 30 °F (0 °C)

Typical Pedon

Oi—2 inches to 0 (5 cm to 0); mat of slightly decomposed litter from alpine tundra vegetation
A—0 to 2 inches (0 to 5 cm); very dark brown (10YR 2/2) silt loam; weak fine subangular blocky structure; very friable; many fine roots; very strongly acid; abrupt smooth boundary
E—2 to 3 inches (5 to 8 cm); dark grayish brown (10YR 4/2) silt loam; weak fine subangular blocky structure; very friable; many fine roots; very strongly acid; abrupt broken boundary
Bhs1—3 to 4 inches (8 to 10 cm); dark reddish brown (5YR 2.5/2) silt loam; weak fine granular structure; very friable; smeary; pockets of dark grayish brown (10YR 4/2) and very dusky red (2.5YR 2.5/2) frost churned material; very strongly acid; abrupt broken boundary
Bhs2—4 to 7 inches (10 to 18 cm); very dusky red (2.5YR 2.5/2) silt loam; weak fine granular structure; very friable; smeary; pockets of dark reddish brown (5YR 2.5/2) and dark reddish brown (5YR 3/4) frost churned material; very strongly acid; gradual broken boundary
Bs—7 to 12 inches (18 to 30 cm); dark reddish brown (5YR 3/4) silt loam; weak fine granular structure; very friable; slightly smeary; pockets of very dusky red (2.5YR 2.5/2) and brown (10YR 4/3) frost churned material; very strongly acid; gradual broken boundary
C—12 to 17 inches (30 to 43 cm); brown (10YR 4/3) gravelly silt loam; 25 percent gravel; massive; friable; very strongly acid; abrupt wavy boundary
R—17 inches (43 cm); hard granite bedrock

Typical Pedon Location

Map unit in which located: 206—Chuit and Nakochna silt loams, 3 to 30 percent slopes
Location in survey area: in the NE1/4, NW1/4 of sec. 2, T. 19 N., R. 13 W., Seward Meridian

Range in Characteristics

Profile feature: depth to bedrock—14 to 20 inches (35 to 50 cm)
Organic layer: thickness—1 to 4 inches (2 to 10 cm

A horizon:
Color—hue of 5YR, 7.5YR, 10YR; value moist of 2 to 4; chroma moist of 1 to 3
Reaction—very strongly or strongly acid

E horizon:
Color—hue of 5YR, 7.5YR, 10YR; value moist of 4 to 6; chroma moist of 1 or 2
Texture—silt loam, very fine sandy loam
Reaction—very strongly or strongly acid

Bhs horizon:
Color—hue of 2.5YR to 10YR; value moist of 2 or 3; chroma moist of 1 or 2
Texture—silt loam, very fine sandy loam
Reaction—very strongly or strongly acid

Bs horizon:
Color—hue of 2.5YR to 10YR; value moist of 3 to 5; chroma moist of 3 to 6
Texture—silt loam or very fine sandy loam
Coarse fragments—gravel content—5 to 25 percent; cobble content—5 to 10 percent
Reaction—very strongly or strongly acid

C horizon:
Color—hue of 2.5YR to 10YR; value moist of 3 to 5; chroma moist of 3 to 6
Texture—silt loam, sandy loam
Rock fragments—10 to 35 percent; gravel content—5 to 25 percent; cobble content—5 to 10 percent
Reaction—very strongly or strongly acid

Nancy Series

Taxonomic class: medial over sandy or sandy-skeletal, mixed Andic Haplocryods
Depth class: very deep
Drainage class: well drained
Permeability: in the loess mantle—moderate; in the sandy and gravelly substratum—rapid
Position on landscape: alluvial terraces
Parent material: ash-influenced loess deposited over sandy and gravelly alluvium
Slope range: 0 to 45 percent
Elevation: 50 to 1500 feet (15 to 457 m)
Precipitation: 28 inches (71 cm)
Air temperature: 32 °F (0 °C)

Typical Pedon

Oe—1 inch to 0 (3 cm to 0); dark brown (7.5YR 3/2) mat of decomposing forest litter; many fine and medium roots; abrupt smooth boundary
A—0 to 3 inches (0 to 8 cm); very dark grayish brown (10YR 3/2) silt loam; weak fine granular structure; friable; many fine roots; very strongly acid; abrupt wavy boundary
E—3 to 4 inches (8 to 10 cm); grayish brown (10YR 5/2) silt loam; weak fine granular structure; friable; many fine roots; very strongly acid; abrupt smooth boundary
Bhs—4 to 7 inches (10 to 18 cm); dark brown (7.5YR 3/2) silt loam; weak fine subangular blocky structure; friable; few fine roots; strongly acid; abrupt smooth boundary
Bs—7 to 11 inches (18 to 28 cm); brown (7.5YR 4/4) silt loam; weak fine subangular blocky structure; friable; few fine roots; strongly acid; abrupt smooth boundary
Eb—11 to 13 inches (28 to 33 cm); dark brown (7.5YR 3/2) silt loam; weak fine subangular blocky structure; friable; few fine roots; strongly acid; abrupt smooth boundary
Bsb—13 to 20 inches (33 to 50 cm); dark reddish brown (5YR 3/3) silt loam; weak fine subangular blocky structure; friable; strongly acid; clear smooth boundary
2C—20 to 60 inches (50 to 150 cm); variegated very gravelly sand; single grain; loose; 25 percent gravel, 15 percent cobbles; strongly acid

Typical Pedon Location

Map unit in which located: 218—Nancy-Kashwitna complex, 0 to 2 percent slopes
Location in survey area: in the NE1/4, SE1/4 of sec. 16, T. 13 N., R. 11 W., Seward Meridian

Range in Characteristics

Depth to sandy and gravelly substratum: 20 to 30 inches (50 to 76 cm)
Organic layer: thickness—1 to 5 inches (2 to 12 cm)

A horizon:
Color—hue of 5YR, 7.5YR, 10YR; value moist of 2 or 3; chroma moist of 2 or 3
Texture—dominantly silt loam, but some areas are very fine sandy loam, or fine sandy loam
Consistence—friable
Reaction—extremely to strongly acid

E horizon:
Color—hue of 5YR, 7.5YR, 10YR; value moist of 4 to 6; chroma moist of 1 or 2
Texture—silt loam
Consistence—friable
Reaction—very strongly to strongly acid

Bhs horizon:
Color—hue of 2.5YR, 5YR, 7.5YR; value moist of 3 to 5; chroma moist of 2 to 4
Texture—silt loam, very fine sandy loam
Consistence—friable
Reaction—very strongly to strongly acid

Bs horizon:
Color—hue of 5YR, 7.5YR, 10YR; value moist of 3 to 5; chroma moist of 3 to 6
Texture—silt loam, very fine sandy loam
Consistence—friable
Reaction—very strongly to strongly acid

2C horizon:
Color—hue of 10YR or 2.5Y
Texture—ranges from sand to very gravelly sand
Rock fragments—10 to 50 percent; gravel content—10 to 45 percent; cobble content—0 to 15 percent
Consistence—loose
Reaction—strongly or moderately acid

Niklason Series

Taxonomic class: coarse-loamy over sandy or sandy-skeletal, mixed, nonacid Typic Cryofluvents
Taxadjunct features: Reaction is less than 5.5 in all parts of the control section. In this survey area these soils classify as coarse-loamy over sandy or sandy-skeletal, mixed, acid Typic Cryofluvents.
Depth class: very deep
Drainage class: well drained
Permeability: in the loamy material—moderately rapid; in the sandy and gravelly underlying

material—rapid
Position on landscape: floodplains, alluvial fans, natural levees
Parent material: stratified loamy material over sandy and gravelly underlying material
Slope range: 0 to 2 percent
Elevation: 25 to 1000 feet (7 to 304 m)
Precipitation: 28 inches (71 cm)
Air temperature: 32 °F (0 °C)

Typical Pedon

A—0 to 4 inches (0 to 10 cm); dark brown (7.5YR 3/2) silt loam; weak fine granular structure; friable; many fine and medium roots; very strongly acid; clear smooth boundary
C1—4 to 21 inches (10 to 53 cm); brown (10YR 4/3) sandy loam; massive; very friable; common medium pockets of light gray (10YR 6/1) silt loam; few strata of fine and medium sand; few medium roots; very strongly acid; abrupt smooth boundary
C2—21 to 25 inches (53 to 63 cm); light gray (10YR 6/1) silt loam; massive; very friable; common medium distinct dark reddish brown (5YR 3/4) patches; very strongly acid; abrupt smooth boundary
2C3—25 to 60 inches (63 to 150 cm); variegated extremely gravelly sand; single grain; loose; 65 percent gravel, 15 percent cobble; very strongly acid

Typical Pedon Location

Map unit in which located: 225—Niklason silt loam, 0 to 2 percent slopes
Location in survey area: in the NW1/4 of sec. 27, T. 16 N., R. 12 W., Seward Meridian

Range in Characteristics

Depth to sandy and gravelly underlying material: 14 to 40 inches (35 to 100 cm); lenses of buried organic matter are at varying depths in some pedons
Organic layer: thickness—0 to 2 inches (0 to 5 cm)

A horizon:
Color—hue of 7.5YR to 2.5Y; value moist of 3 or 4; chroma moist of 1 to 4
Texture—silt loam, very fine sandy loam, fine sandy loam
Reaction—very strongly or strongly acid

C horizon:
Color—hue of 10YR to 5Y; value moist of 3 to 6; chroma moist of 1 to 3
Texture—stratified silt loam, sandy loam, very fine sand
Reaction—very strongly or strongly acid

2C horizon:
Color—hue of 10YR to 5Y; value moist of 3 to 6; chroma moist of 1 to 3
Texture—sands and gravel
Rock fragments—40 to 70 percent; gravel content—30 to 45 percent; cobble content—10 to 20 percent
Reaction—very strongly or strongly acid

Taxadjunct Features

Map unit 225: Reaction is less than 5.5 in all parts of the control section. In this survey area these soils classify as coarse-loamy over sandy or sandy-skeletal, mixed, acid Typic Cryofluvents.

Puntilla Series

Taxonomic class: medial over loamy, mixed Andic Humicryods
Depth class: very deep
Drainage class: well drained
Permeability: in the loess mantle—moderate; in the glacial till substratum—moderately slow
Position on landscape: mountain side slopes
Parent material: ash-influenced loess deposited over firm glacial till substratum
Slope range: 7 to 45 percent
Elevation: 600 to 2000 feet (182 to 609 m)
Precipitation: 28 inches (71 cm)
Air temperature: 31 °F (-.5 °C)

Typical Pedon

Oi—6 inches to 0 (15 cm to 0); mat of roots and slightly decomposed litter from grass; abrupt smooth boundary
A—0 to 4 inches (0 to 10 cm); black (10YR 2/1) silt loam; moderate medium granular structure; friable; many fine roots; extremely acid; abrupt smooth boundary
E—4 to 6 inches (10 to 15 cm); dark gray (10YR 4/1) silt loam; weak medium granular structure; friable; many fine roots; extremely acid; abrupt smooth boundary
Bhs—6 to 10 inches (15 to 25 cm); very dark brown (10YR 2/2) silt loam; strong medium granular structure; friable; slightly smeary; common fine roots; very strongly acid; clear wavy boundary
Bs1—10 to 15 inches (25 to 38 cm); yellowish red (5YR 4/6) silt loam; moderate coarse subangular blocky structure; friable; slightly smeary; few fine

roots; very strongly acid; clear wavy boundary
Bs2—15 to 17 inches (38 to 43 cm); yellowish red (5YR 5/8) silt loam; weak fine subangular blocky structure; friable; slightly smeary; few fine roots; strongly acid; clear wavy boundary
BC—17 to 21 inches (43 to 53 cm); yellowish brown (10YR 5/6) loam; weak fine subangular blocky structure; friable; few fine roots; common medium distinct patches of strong brown (7.5YR 5/8); strongly acid; abrupt wavy boundary
C—21 to 26 inches (53 to 65 cm); pale brown (10YR 6/3) loam; massive; friable; strongly acid; clear wavy boundary
Bsb—26 to 30 inches (65 to 75 cm); very dark grayish brown (10YR 3/2) silt loam; weak medium subangular blocky structure; friable; slightly smeary; common large prominent patches of strong brown (7.5YR 5/8); strongly acid; abrupt smooth boundary
C1—30 to 36 inches (75 to 90 cm); dark grayish brown (2.5YR 4/2) silt loam; massive; friable; strongly acid; abrupt smooth boundary
2C2—36 to 60 inches (90 to 150 cm); olive gray (5Y 4/2) gravelly loam; massive; firm; 20 percent gravel, 5 percent cobble; strongly acid

Typical Pedon Location

Map unit in which located: 226—Puntilla silt loam, 7 to 20 percent slopes
Location in survey area: in the NW1/4 of sec. 17, T. 24 N., R. 11W., Seward Meridian

Range in Characteristics

Depth to the firm glacial till substratum: 14 to 38 inches (35 to 96 cm)
Organic layer: thickness—1 to 6 inches (2 to 15 cm)

A horizon:
Color—hue of 5YR, 7.5YR, 10YR, neutral; value moist of 2 or 3; chroma moist of 0 to 2
Texture—dominantly silt loam, but some areas are very fine sandy loam
Consistence—friable
Reaction—extremely to strongly acid

E horizon:
Color—hue of 5YR, 7.5YR, 10YR; value moist of 4 to 6; chroma moist of 1 or 2
Texture—silt loam

Bhs horizon:
Color—hue of 2.5YR to 10YR; value moist of 2 or 3; chroma moist of 1 or 2
Texture—silt loam, loam, and very fine sandy loam
Consistence—friable
Reaction—extremely to strongly acid

Bs horizon:
Color—hue of 2.5YR to 10YR; value moist of 3 to 5; chroma moist of 2 to 8
Texture—silt loam, loam, and very fine sandy loam
Consistence—friable
Reaction—extremely to strongly acid

2C horizon:
Color—hue of 2.5Y or 5Y; value moist of 3 to 6; chroma moist of 1 to 3
Texture—loam or silt loam
Rock fragments—5 to 35 percent; gravel content—5 to 25 percent; cobble content—0 to 10 percent
Consistence—firm
Reaction—very strongly or strongly acid

Salamatof Series

Taxonomic class: Dysic Sphagnic Borofibrists
Depth class: very deep
Drainage class: very poorly drained
Permeability: rapid
Position on landscape: muskegs
Parent material: coarse peat deposits
Slope range: 0 to 2 percent
Elevation: 50 to 1200 feet (15 to 365 m)
Precipitation: 28 inches (71 cm)
Air temperature: 32 °F (0 °C)

Typical Pedon

Oi1—0 to 8 inches (0 to 20 cm); reddish brown (5YR 4/4) sphagnum peat; extremely acid
Oi2—8 to 18 inches (20 to 45 cm); dark reddish brown (5YR 3/3) sphagnum peat; about 85 percent fibers; extremely acid
Oi3—18 to 41 inches (45 to 103 cm); dark reddish brown (5YR 3/2) decomposing peat; about 75 percent fibers; extremely acid
Oe—41 to 65 inches (103 to 163 cm); dark reddish brown (5YR 2.5/2) mucky peat; about 25 to 50 percent fibers; few thin strata of mineral material below 60 inches; extremely acid

Typical Pedon Location

Map unit in which located: 231—Salamatof peat, 0 to 2 percent slopes
Location in survey area: in the SE1/4, NE1/4 of sec. 3, T. 22 N., R. 13 W., Seward Meridian

Range in Characteristics

Depth to water table: +12 to 6 inches (+30 to 15 cm)

Schrock Series

Taxonomic class: medial over loamy, mixed Entic Haplocryods
Depth class: very deep
Drainage class: well drained
Permeability: in the loess mantle—moderate; in the gravelly substratum—rapid
Position on landscape: stream terraces
Parent material: ash—influenced loess deposited over coarser textured alluvium
Slope range: 0 to 2 percent
Elevation: 50 to 500 feet (15 to 152 m)
Precipitation: 28 inches (71 cm)
Air temperature: 32 °F (0 °C)

Typical Pedon

Oe—2 inches to 0 (5 cm to 0); dark brown (7.5YR 3/2) mat of decomposing forest litter; abrupt smooth boundary
E—0 to 2 inches (0 to 5 cm); gray (10YR 5/1) silt loam; weak fine granular structure; friable; very strongly acid; abrupt wavy boundary
B—2 to 9 inches (5 to 23 cm); dark brown (10YR 2/3) silt loam; common medium prominent grayish brown (10YR 5/2) mottles; weak medium subangular blocky structure; friable; moderately acid; abrupt wavy boundary
Eb—9 to 11 inches (23 to 28 cm); gray (10YR 5/1) silt loam; weak coarse platy structure; friable; moderately acid; abrupt irregular boundary
Bs1b—11 to 18 inches (28 to 45 cm); strong brown (7.5YR 4/6) silt loam; weak fine subangular blocky structure; friable; moderately acid; clear irregular boundary
Bs2b—18 to 21 inches (45 to 53 cm); brown (7.5YR 4/4) silt loam; weak fine subangular blocky structure; friable; moderately acid; abrupt wavy boundary
BCb—21 to 29 inches (53 to 73 cm); dark grayish brown (10YR 4/2) very fine sandy loam; weak fine granular structure; friable; moderately acid; gradual wavy boundary
2C1—29 to 36 inches (73 to 90 cm); black (5Y 2.5/2) loamy fine sand; single grain; very friable; moderately acid; clear wavy boundary
2C2—36 to 43 inches (90 to 108 cm); black (5Y 2.5/2) silt loam; massive; friable; moderately acid; gradual wavy boundary
2C3—43 to 60 inches (108 to 150 cm); black (5Y 2.5/2) stratified very cobbly fine sandy loam and silt loam; 20 percent waterworn gravel and 20 percent waterworn cobbles by volume; massive; friable; moderately acid

Typical Pedon Location

Map unit in which located: 232—Schrock silt loam, 0 to 2 percent slopes
Location in survey area: in the NE1/4, SW1/4 of sec. 29, T. 28 N., R. 5 W., Seward Meridian

Range in Characteristics

Profile feature: A horizons are present in some pedons.
Loess mantle: thickness—14 to 28 inches (35 to 71 cm)
Organic layer: thickness—1 to 4 inches (25 to 101 cm)
A horizon:
Color—hue of 10YR, 2.5Y; value moist of 3 or 4; chroma moist of 2 to 4
Texture—dominantly silt loam, but some areas are very fine sandy loam

E horizon:
Color—value moist of 4 or 5; chroma moist of 1 or 2
Texture—dominantly silt loam, but some areas are very fine sandy loam
Consistence—friable
Reaction—strongly or moderately acid

B horizon:
Color—hue of 7.5YR, 10YR ; value moist of 3 or 4; chroma moist of 2 to 4
Texture—silt loam
Consistence—friable
Reaction—strongly or moderately acid

BC horizon:
Color—hue of 10YR, 2.5Y; value moist of 4 to 6; chroma moist of 2 to 6
Texture—silt loam, very fine sandy loam
Consistence—friable
Reaction—strongly or moderately acid

2C horizon:
Color—hue of 10YR, 2.5Y, 5Y; value moist of 2 to 5; chroma moist of 1 to 3
Texture—stratified gravelly and sandy sediments
Rock fragments—25 to 45 percent
Consistence—loose
Reaction—strongly or moderately acid

Slikok Series

Taxonomic class: coarse-silty, mixed, acid Histic Cryaquepts
Depth class: very deep
Drainage class: very poorly drained
Permeability: in the upper part—moderate; in the firm glacial till substratum—slow
Position on landscape: toeslopes of moraines, muskeg borders and depressional areas
Parent material: volcanic ash-influenced mineral materials over glacial till
Slope range: 0 to 5 percent
Elevation: 50 to 1500 feet (15 to 457 m)
Precipitation: 28 inches (71 cm)
Air temperature: 32 °F (0 °C)

Typical Pedon

Oe—13 to 11 inches (33 to 28 cm); black (10YR 2/1) mucky peat; few coarse woody particles; many roots; clear smooth boundary
Oa—11 inches to 0 (28 cm to 0); black (10YR 2/1) muck; few coarse woody particles; common roots; thin strata of silty materials; strongly acid; gradual smooth boundary
A1—0 to 3 inches (0 to 8 cm); dark yellowish brown (10YR 3/4) mucky silt loam; weak fine granular structure; nonsticky, nonplastic; strongly acid; gradual smooth boundary
A2—3 to 6 inches (8 to 15 cm); very dark brown (10YR 2/2) mucky silt loam; weak fine granular structure; nonsticky, nonplastic; strongly acid; gradual smooth boundary
A3—6 to 26 inches (15 to 65 cm); dark brown (10YR 3/3) mucky silt loam; weak fine granular structure; nonsticky, nonplastic; strongly acid; gradual smooth boundary
AC—26 to 41 inches (65 to 103 cm); dark grayish brown (10YR 4/2) mucky silt loam; massive; nonsticky, nonplastic; strongly acid; gradual smooth boundary
2C—41 to 60 inches (103 to 150 cm); grayish brown (10YR 5/2) gravelly silt loam; massive; firm; 20 percent gravel, 5 percent cobble; strongly acid

Typical Pedon Location

Map unit in which located: 233—Slikok muck, 0 to 5 percent slopes
Location in survey area: in the NW1/4, SW1/4 of sec. 7, T. 13 N., R. 12 W., Seward Meridian

Range in Characteristics

Depth to firm glacial till substratum: more than 40 inches (more than 101 cm)
Depth to water table: +12 to 12 inches (+30 to 30 cm)
Organic layer: thickness—5 to 15 inches (12 to 38 cm)

A horizon:
Color—hue of 5YR, 7.5YR, 10YR; value moist of 1 to 3; chroma moist of 1 to 3
Texture—mucky silt loam with grayish silt loam lenses
Reaction—very strongly or strongly acid

AC horizon:
Color—hue of 5YR, 7.5YR, 10YR; value moist of 2 to 4; chroma moist of 1 to 3
Texture—mucky silt loam with silt loam and sandy lenses
Reaction—strongly acid
2C horizon:
Color—hue of 7.5YR, 10YR, 2.5Y; value moist of 2 to 4; chroma moist of 1 to 3
Texture—silt loam, sandy loam, sand
Rock fragments—25 to 30 percent
Reaction—strongly acid

Spenard Series

Taxonomic class: medial over loamy, mixed Andic Cryaquods
Depth class: very deep
Drainage class: very poorly drained
Permeability: in the loess mantle—moderate; in the firm glacial till substratum—moderately slow
Position on landscape: moraines and mountain side slopes and footslopes
Parent material: volcanic ash-influenced loess over firm glacial till substratum
Slope range: 0 to 12 percent
Elevation: 50 to 1500 feet (15 to 457 m)
Precipitation: 26 inches (66 cm)
Air temperature: 32 °F (0 °C)

Typical Pedon

Oa—2 inches to 0 (5 cm to 0); organic layer consisting of decomposing grass and forest litter; abrupt smooth boundary
E—0 to 2 inches (0 to 5 cm); dark reddish brown (5YR 3/2) silt loam; moderate fine subangular blocky structure; friable; many fine and medium roots; very strongly acid; abrupt smooth boundary
Bhs—2 to 4 inches (5 to 10 cm); dark reddish brown (5YR 3/3) silt loam; moderate medium subangular blocky structure; friable; many fine and common medium roots; very strongly acid; abrupt wavy

boundary
Bs1—4 to 6 inches (10 to 15 cm); brown (7.5YR 4/2) silt loam; weak medium subangular blocky structure; friable; common fine and few medium roots; very strongly acid; abrupt wavy boundary
Bs2—6 to 14 inches (15 to 35 cm); yellowish brown (10YR 5/4) silt loam; many medium distinct yellowish red (5YR 5/8) mottles; weak fine subangular blocky structure; friable; very strongly acid; abrupt smooth boundary
C—14 to 16 inches (35 to 40 cm); grayish brown (2.5Y 5/2) sandy loam; many medium distinct yellowish red (5YR 5/8) mottles; single grain; loose; very strongly acid; abrupt smooth boundary
EBb—16 to 25 inches (40 to 63 cm); dark brown (7.5YR 3/2) silt loam; few medium distinct yellowish red (5YR 5/8) mottles; weak medium subangular blocky structure; friable; very strongly acid; clear smooth boundary
2C—25 to 60 inches (63 to 150 cm); yellowish brown (10YR 5/4) gravelly loam; 20 percent gravel and 10 percent cobbles; massive; firm; very strongly acid

Typical Pedon Location

Map unit in which located: 235—Spenard silt loam, 0 to 7 percent slopes
Location in survey area: in the SW1/4, NE1/4 of sec. 3, T. 17 N., R. 12 W., Seward Meridian

Range in Characteristics

Depth to firm glacial till substratum: 20 to 36 inches (50 to 91 cm)
Depth to water table: 6 to 24 inches (15 to 60 cm)
Organic layer: thickness—0 to 10 inches (0 to 25 cm)

A horizon:
Color—hue of 5YR to 2.5Y; value moist of 3 or 4; chroma moist of 1 or 2
Texture—silt loam or very fine sandy loam
Consistence—friable

E horizon:
Color—hue of 5YR to 2.5Y; value moist of 3 or 4; chroma moist of 1 to 3
Consistence—friable

Bs horizon:
Color—hue of 5YR, 7.5YR, 10YR; value moist of 3 to 5; chroma moist of 2 to 4
Texture—silt loam, very fine sandy loam
Consistence—friable

2C horizon:
Color—hue of olive, gray or brown
Texture—loam, silt loam, silty clay loam
Rock fragments—5 to 30 percent; gravel content—5 to 20 percent; cobble content—0 to 10 percent
Consistence—firm
Reaction—very strongly or strongly acid

Starichkof Series

Taxonomic class: Dysic Fluvaquentic Borohemists
Depth class: very deep
Drainage class: very poorly drained
Permeability: rapid
Position on landscape: muskegs
Parent material: coarse peat containing thin stratas of mineral material
Slope range: 0 to 7 percent
Elevation: 50 to 1500 feet (15 to 457 m)
Precipitation: 28 inches (71 cm)
Air temperature: 32 °F (0 °C)

Typical Pedon

Oi—0 to 12 inches (0 to 30 cm); dark brown (7.5YR 3/4) peat; few sedge and shrub roots; about 80 percent fibers, 60 percent after rubbing; extremely acid
Oe1—12 to 27 inches (30 to 68 cm); dark brown (7.5YR 3/4) peat; about 50 percent fibers after rubbing; very strongly acid
2C1—27 to 30 inches (68 to 75 cm); grayish brown (2.5Y 5/2) fine sandy loam; massive; very friable; very strongly acid; abrupt smooth boundary
Oe2—30 to 40 inches (75 to 100 cm); dark brown (7.5YR 3/4) peat; about 40 percent fibers after rubbing; very strongly acid
2C2—40 to 41 inches (100 to 103 cm); grayish brown (2.5Y 5/2) silt loam; massive; friable; very strongly acid; abrupt smooth boundary
Oe3—41 to 63 inches (103 to 158 cm); dark brown (7.5YR 3/4) peat; about 35 percent fibers after rubbing; common thin strata of brown and pale brown silt loam; very strongly acid

Typical Pedon Location

Map unit in which located: 236—Starichkof peat, 0 to 7 percent slopes
Location in survey area: about 1500 feet (457 m) north and 200 feet (60 m) east of the SW corner of sec. 10, T. 23 N., R. 14 W., Seward Meridian

Range in Characteristics

Profile feature: Organic material commonly is

decomposing sphagnum moss peat.
Depth to water table: +12 to 6 inches (+30 to 15 cm)

Surface tier:
Color—hue of 5YR, 7.5YR; value moist of 2 to 5; chroma moist of 2 to 4
Fiber content—80 to 90 percent unrubbed and 40 to 70 percent rubbed
Reaction—extremely to very strongly acid
Surface tier:
Color—hue of 5YR, 7.5YR, 10YR; value moist of 2 or 3; chroma moist of 2 to 4
Fiber content—60 to 65 percent unrubbed and 20 to 40 percent rubbed
Reaction—extremely or very strongly acid
Other—Layers up to 8 inches thick of coarse moss peat may occur at any depth; thin layers of mineral soil, volcanic ash and woody fragments may occur within the control section.

Strandline Series

Taxonomic class: medial over loamy, mixed Andic Haplocryods
Depth class: very deep
Drainage class: well drained
Permeability: in the upper part—moderate; in the glacial till substratum—moderately slow
Position on landscape: moraines, and mountain footslopes
Parent material: ash-influenced loess overlying firm glacial till
Slope range: 2 to 45 percent
Elevation: 50 to 1500 feet (15 to 457 m)
Precipitation: 28 inches (71 cm)
Air temperature: 32 °F (0 °C)

Typical Pedon

Oe—2 inches to 0 (5 cm to 0); mat of roots and moderately decomposed forest litter; abrupt smooth boundary
A—0 to 2 inches (0 to 5 cm); dark reddish brown (5YR 3/2) silt loam; weak fine granular structure; very friable; many fine and medium roots; very strongly acid; abrupt smooth boundary
E—2 to 5 inches (5 to 13 cm); gray (10YR 5/1) silt loam; weak fine granular structure; very friable; many fine and medium roots; very strongly acid; abrupt smooth boundary
Bhs—5 to 8 inches (13 to 20 cm); dark reddish brown (5YR 3/4) silt loam; weak fine subangular blocky structure; very friable; smeary; common fine and few medium roots; very strongly acid; abrupt smooth boundary
Bs1—8 to 15 inches (20 to 38 cm); dark brown (7.5YR 4/4) silt loam; weak fine subangular blocky structure; very friable; smeary; few fine and medium distinct yellowish brown (10YR 4/4) and strong brown (7.5YR 5/6) stains along root channels; few fine and medium roots; very strongly acid; clear wavy boundary
Bs2—15 to 18 inches (38 to 45 cm); dark yellowish brown (10YR 4/4) silt loam; weak fine subangular blocky structure; very friable; slightly smeary; few fine distinct strong brown (7.5YR 5/6) stains along root channels; few fine roots; very strongly acid; clear smooth boundary
Bs3—18 to 20 inches (45 to 50 cm); brownish yellow (10YR 6/6) silt loam; weak fine subangular blocky structure; very friable; few fine distinct strong brown (7.5YR 5/6) and light brown (7.5YR 6/4) stains along root channels; slightly smeary; very strongly acid; clear smooth boundary
Eb—20 to 22 inches (50 to 55 cm); gray (5Y 5/1) silt loam; weak fine subangular blocky structure; very friable; common medium distinct patches of strong brown (7.5YR 4/6); very strongly acid; abrupt smooth boundary
Bsb—22 to 26 inches (55 to 65 cm); dark yellowish brown (10YR 4/4) silt loam; weak fine subangular blocky structure; very friable; strongly acid; gradual wavy boundary
BCb—26 to 31 inches (65 to 78 cm); dark grayish brown (2.5YR 4/2) silt loam; weak fine subangular blocky structure; very friable; strongly acid; clear wavy boundary
2C—31 to 60 inches (78 to 150 cm); olive gray (5Y 5/2) gravelly silt loam; massive; firm; 15 percent gravel and 5 percent cobbles; strongly acid

Typical Pedon Location

Map unit in which located: 240—Strandline-Spenard-Kroto complex, 2 to 30 percent slopes
Location in survey area: in the SW1/4, NW1/4 of sec. 17, T. 22 N., R. 10 W., Seward Meridian

Range in Characteristics

Depth to firm glacial till substratum: 20 to 37 inches (50 to 93 cm)
Organic layer: thickness—1 to 4 inches (3 to 10 cm)

A horizon:
Color—hue of 5YR, 7.5YR, 10YR; value moist of 2 or 3; chroma moist of 1 or 2
Consistence—very friable, friable
Reaction—extremely to strongly acid

E horizon:
Color—hue of 5YR, 7.5YR, 10YR; value moist of 4 to

6; chroma moist of 1 or 2
Texture—silt loam, very fine sandy loam
Consistence—very friable
Reaction—extremely to strongly acid

Bhs horizon:
Color—hue of 2.5YR to 10YR; value moist of 2 or 3; chroma moist of 1 to 4
Texture—silt loam, very fine sandy loam
Consistence—friable
Reaction—extremely to strongly acid

Bs horizon:
Color—hue of 2.5YR to 10YR; value moist of 4 to 6; chroma moist of 3 to 6
Texture—silt loam, very fine sandy loam
Consistence—friable
Reaction—extremely to strongly acid

2C horizon:
Color—hue of 5Y; value moist of 4 or 5; chroma moist of 2
Texture—loam, silt loam
Rock fragments—5 to 35 percent; gravel content—5 to 30 percent; cobble content—0 to 5 percent
Consistence—firm
Reaction—very strongly to strongly acid
Other—C horizons occur in some pedons below the buried solum.

Suntrana Series

Taxonomic class: medial over loamy, mixed Andic Cryaquods
Depth class: very deep
Drainage class: poorly drained
Permeability: in the loess mantle—moderate; in the firm substratum—very slow
Position on landscape: remnant glacial moraines adjacent to Cook Inlet
Parent material: loess deposited over alluvial sediments which overlie firm glacial till
Slope range: 2 to 7 percent
Elevation: 20 to 200 feet (6 to 60 m)
Precipitation: 28 inches (71 cm)
Air temperature: 32 °F (0 °C)

Typical Pedon

Oe—4 inches to 0 (10 cm to 0); very dark brown (10YR 2/2) partially decomposed forest litter and moss; abrupt smooth boundary
E—0 to 1 inch (0 to 3 cm); dark grayish brown (10YR 4/2) silt loam; weak fine subangular blocky structure; friable; many fine roots; strongly acid; abrupt smooth boundary
Bs1—1 to 3 inches (3 to 8 cm); very dark gray (10YR 3/1) silt loam; weak fine subangular blocky structure; friable; many fine roots; strongly acid; abrupt smooth boundary
Bs2—3 to 5 inches (8 to 13 cm); dark brown (7.5YR 3/2) silt loam; few fine prominent yellowish red (5YR 4/6) mottles; weak fine subangular blocky structure; friable; common fine roots; strongly acid; abrupt smooth boundary
C1—5 to 10 inches (13 to 25 cm); grayish brown (10YR 5/2) very fine sandy loam; common medium prominent yellowish red (5YR 4/6) mottles; massive; friable; strongly acid; abrupt smooth boundary
C2—10 to 20 inches (25 to 50 cm); pale brown (10YR 6/3) silt loam; few fine faint brown (10YR 5/3) mottles; massive; friable; moderately acid; abrupt smooth boundary
2C—20 to 60 inches (50 to 150 cm); brown (10YR 5/3) silty clay loam; common fine faint dark yellowish brown (10YR 4/4) mottles; massive; very firm; moderately acid

Typical Pedon Location

Map unit in which located: 241—Suntrana silt loam, 2 to 7 percent slopes
Location in survey area: in the NE1/4, SE1/4 of sec. 11, T. 14 N., R. 9 w., Seward Meridian

Range in Characteristics

Depth to firm substratum: 10 to 20 inches (25 to 50 cm); water table at a depth of 18 to 36 inches (45 to 91 cm)
Organic layer: thickness—2 to 6 inches (5 to 15 cm)

A horizon:
Color—hue of 7.5YR, 10YR; value moist of 2 or 3; chroma moist of 1 or 2
Texture—silt loam
Consistence—friable
Reaction—strongly acid to extremely acid

E horizon:
Color—hue of 10YR; value moist of 2 to 6; chroma moist of 1 or 2
Texture—silt loam
Consistence—friable
Reaction—strongly acid to extremely acid

Bs horizon:
Color—hue of 5YR, 7.5YR, 10YR; value moist of 3 to 5; chroma moist of 2 to 4
Texture—silt loam, very fine sandy loam
Consistence—friable

Reaction—strongly acid to very strongly acid

C horizon:
Color—hue of 10YR, 2.5Y; value moist of 4 to 6; chroma moist of 2 to 4
Texture—silt loam, very fine sandy loam
Consistence—friable
Reaction—moderately to very strongly acid

2C horizon:
Color—hue of 10YR, 2.5Y; value moist of 4 to 6; chroma moist of 2 or 3
Texture—silty clay loam, silty clay
Consistence—firm, very firm
Reaction—moderately to very strongly acid

Susitna Series

Taxonomic class: coarse-loamy, mixed, nonacid Typic Cryofluvents
Depth class: very deep
Drainage class: well drained
Permeability: in the loamy material—moderate; in the sand and gravel—rapid
Position on landscape: floodplains, and alluvial terraces
Parent material: stratified loamy alluvium over sand and gravel
Slope range: 0 to 2 percent
Elevation: 50 to 800 feet (15 to 242 m)
Precipitation: 28 inches (71 cm)
Air temperature: 32 °F (0 °C)

Typical Pedon

Oe—4 inches to 0 (10 cm to 0); dark reddish brown (5YR 2/2) mat of decomposing forest litter; many fine and medium roots; abrupt wavy boundary
A—0 to 4 inches (0 to 10 cm); very dark grayish brown (2.5Y 3/2) silt loam; weak fine subangular blocky structure; friable, nonsticky and nonplastic; common fine and medium roots; strongly acid; abrupt smooth boundary
C1—4 to 15 inches (10 to 38 cm); pale brown (10YR 6/3) stratified fine sandy loam and loamy fine sand; massive; very friable, nonsticky and nonplastic; common fine roots; few fine gravel; strongly acid; clear smooth boundary
C2—15 to 31 inches (38 to 78 cm); dark gray (5Y 4/1) stratified silt loam and very fine sandy loam; massive; very friable; nonsticky and nonplastic; common fine roots; moderately acid; clear smooth boundary
C3—31 to 48 inches (78 to 120 cm); dark gray (5Y 4/1) loam; massive; very friable; nonsticky and nonplastic; few fine roots; many medium and coarse prominent patches of strong brown (7.5YR 4/6); strongly acid; abrupt smooth boundary
2C—48 to 60 inches (120 to 150 cm); variegated very gravelly sand; single grained; very friable; 25 percent gravel, 15 percent cobbles; strongly acid

Typical Pedon Location

Map unit in which located: 242—Susitna and Niklason silt loams, 0 to 2 percent slopes
Location in survey area: about 600 feet (182 m) north and 400 feet (121 m) west of the SW corner of sec. 1, T. 27 N., R. 11 W., Seward Meridian

Range in Characteristics

Depth to sand and gravel: more than 40 inches (more than 101 cm)
Organic layer: thickness—1 to 4 inches (2 to 10 cm)

A horizon:
Color—hue of 10YR, 2.5Y, 5Y; value moist of 3 or 4; chroma moist of 1 or 2
Texture—dominantly silt loam, but some areas are fine sandy loam, or loamy fine sand
Reaction—very strongly or strongly acid

C horizon:
Color—hue of 10YR, 2.5Y, 5Y; value moist of 3 to 6; chroma moist of 1 to 4
Texture—stratified silt loam, loam, fine sandy loam, loamy fine sand
Reaction—strongly to moderately acid

2C horizon:
Color—hue of 10YR, 2.5Y, 5Y; value moist of 3 to 6; chroma moist of 1 to 3
Texture—sands and gravel
Rock fragments—40 to 65 percent; gravel content—30 to 45 percent; cobble content—10 to 20 percent
Reaction—strongly or moderately acid

Tyonek Series

Taxonomic class: Euic Fluvaquentic Borosaprists
Depth class: very deep
Drainage class: very poorly drained
Permeability: in the organic surface—rapid; in the stratified mineral and organic substratum—moderate
Position on landscape: toeslopes of moraines
Parent material: organic materials interlayered with ash-influenced loess
Slope range: 0 to 2 percent
Elevation: 50 to 800 feet (15 to 243 m)

Precipitation: 28 inches (71 cm)
Air temperature: 32 °F (0 °C)

Typical Pedon

Oi—0 to 4 inches (0 to 10 cm); very dark grayish brown (10YR 3/2) peat; about 75 percent fibers, less than 50 percent rubbed; about 15 percent twigs and woody particles; many fine and medium roots and common coarse roots; extremely acid; clear wavy boundary
Oe—4 to 10 inches (10 to 25 cm); very dark grayish brown (10YR 3/2) mucky peat; about 50 percent fibers, less than 20 percent rubbed; about 5 percent twigs and woody particles; many fine, and common medium and coarse roots; very strongly acid; abrupt smooth boundary
2C1—10 to 11 inches (25 to 28 cm); brown (10YR 5/3) loamy sand; single grain; loose; common fine roots; very strongly acid; abrupt smooth boundary
Oa1—11 to 26 inches (28 to 65 cm); dark grayish brown (10YR 4/2) muck; about 30 percent fibers, 10 percent rubbed; about 15 percent woody fragments; extremely acid; abrupt smooth boundary
2C2—26 to 32 inches (65 to 80 cm); light brownish gray (10YR 6/2) silt loam; massive; friable; few fine roots; very strongly acid; abrupt smooth boundary
Oa2—32 to 60 inches (80 to 150 cm); dark grayish brown (10YR 4/2) muck; about 10 percent fibers, 5 percent rubbed; 5 percent woody fragments; strongly acid

Typical Pedon Location

Map unit in which located: 244—Tyonek peat, 0 to 2 percent slopes
Location in survey area: in the NW1/4, SE1/4 of sec. 29, T. 10 N., R. 14 W., Seward Meridian

Range in Characteristics

Depth to apparent water table: 0 to 6 inches (0 to 15 cm)

O horizon:
Color—hue of 10YR, 7.5YR; value moist of 2 to 4; chroma moist of 1 to 3
Texture—peat, mucky peat, muck
Reaction—extremely to strongly acid
Other—Woody fragments make up 5 to 25 percent by volume; buried logs and branches occur in some pedons.

C horizon:
Color—hue of 10YR; value moist of 3 to 5; chroma moist of 2 to 4

Texture—ranges from silt loam to sand
Reaction—very strongly to moderately acid
Other—Strata of mineral material, with a combined thickness less than 12 inches (30 cm), occur throughout the profile.

Wasilla Series

Taxonomic class: fine-loamy, mixed, acid Humic Cryaquepts
Depth class: very deep
Drainage class: poorly drained
Permeability: moderately slow
Position on landscape: floodplains and alluvial terraces
Parent material: silty alluvium
Slope range: 0 to 2 percent
Elevation: 25 to 1000 feet (7 to 304 m)
Precipitation: 28 inches (71 cm)
Air temperature: 32 °F (0 °C)

Typical Pedon

Oe—4 inches to 0 (10 cm to 0); very dark brown (10YR 2/2) mat of decomposing moss and sedge; many fine and medium roots; abrupt smooth boundary
A1—0 to 2 inches (0 to 5 cm); dark brown (10YR 3/3) silt loam; weak fine granular structure; friable; nonsticky and nonplastic; many fine and medium roots; very strongly acid; abrupt smooth boundary
A2—2 to 10 inches (5 to 25 cm); very dark grayish brown (10YR 3/2) silt loam; moderate fine granular structure; friable; nonsticky and nonplastic; common fine distinct yellowish red (5YR 5/6) mottles; common fine and medium roots; very strongly acid; abrupt smooth boundary
C1g—10 to 26 inches (25 to 65 cm); dark gray (2.5Y 4/0) silt loam; massive; friable; sticky and slightly plastic; common fine prominent strong brown (7.5YR 5/6) mottles; few fine roots; very strongly acid; clear wavy boundary
C2g—26 to 60 inches (65 to 150 cm); light gray (2.5Y 7/2) silt loam stratified with silty clay loam and fine sandy loam; massive; firm; sticky and plastic; common fine distinct yellowish brown (10YR 5/8) mottles; very strongly acid

Typical Pedon Location

Map unit in which located: 245—Wasilla silt loam, 0 to 2 percent slopes

Location in survey area: in the SE1/4, SW1/4 of sec. 23, T. 21 N., R. 9 W., Seward Meridian

Range in Characteristics

Profile feature: Clay content ranges from 18 to 35 percent with greater than 15 percent fine sand or coarser.
Depth to water table: 12 to 36 inches (30 to 90 cm)
Depth to mottles that have chroma of 2 or less: 0 to 20 inches (0 to 50 cm)
Depth to gravelly material or firm glacial till if present: 40 to 60 inches (101 to 150 cm)
Organic layer: thickness—2 to 7 inches (5 to 17 cm)

A horizon:
Color—hue of 7.5YR, 10YR, 2.5Y; value moist of 2 or 3; chroma moist of 1 to 3
Texture—silt loam
Coarse fragments—0 to 15 percent
Consistence—friable
Reaction—very strongly or strongly acid

C horizon:
Color—hue of 10YR, 2.5Y, 5Y; value moist of 4 to 7; chroma moist of 0 to 2
Texture—stratified silt loam, silty clay loam, fine sandy loam
Consistence—friable to firm
Reaction—very strongly or strongly acid

Formation of the Soils

This section describes the factors of soil formation and the effects of these factors on the major soils in the Yentna Area.

Factors of Soil Formation

The interrelated factors that determine soil formation at a particular location include the composition of the parent material, the climate, the relief of the area, the biological organisms in the soil system, and the length of time that these factors have acted together. The magnitude of the effect of any individual factor varies from soil to soil.

The processes of soil formation are quite complex. Their influence and relationship are more easily described by relating soils within a geomorphic unit. In the paragraphs that follow, the climate is described separately first, and then the factors of parent material, relief, time, and biological organisms are considered in the relationship of the soils within geomorphic units.

Climate

In the Yentna Area, the climate is fairly uniform and is transitional in character from the maritime climate of coastal Alaska to the continental climate of Interior Alaska. The average values given describe the climate at Skwentna and do not reflect the microclimatic variations which occur throughout the survey area. Localized variations in precipitation, temperature and frost-free season can be expected.

Yentna Area has short, warm summers and long, cold winters. Soil moisture is adequate early in the growing season due to moisture from melted snow. Rains occur during the summer and available water capacity is sufficient in soils having a thick silty loess mantle. At freeze-up, the silty loess soils usually contain enough moisture that the frost heaving potential is high.

Upon thawing in the spring, the soils will subside slightly. At higher elevations, lower temperatures result in more severe frost churning of the soils.

The surplus soil moisture in the system causes leaching of both organic colloids from the O horizon and dissolved iron and aluminum from the volcanic-ash influenced loess that mantles the Yentna Area. This results in the formation of a spodic horizon in most of the older loess soils. Due to the composition of the parent material, most of the soils in the survey area are low in bases and thus are low in natural fertility.

The short period during which the air and soil temperatures are warm provides an environment for slow decomposition of organic matter and weathering of soil minerals. In alpine grasslands, the organic layer can be quite thick due to the annual cycling of dying vegetation and the short warm season.

Soil Formation by Geomorphic Units

Yentna Area lies within the Cook Inlet-Susitna Lowland Major Land Resource Area. This area includes the Susitna River and its major tributaries, which originate in the western part of the valley, and other tributaries to Cook Inlet. The area includes a glacial till plain from glaciers which originated in the Alaska and Aleutian mountain ranges and the various mountains in the central part of the survey area. Four major geomorphic units and associated landforms are found in the area. These are (1) floodplains, tidal plains and natural levees; (2) alluvial fans and terraces; (3) glacial till plains; and (4) mountainous uplands. The relationship of the soil-forming factors varies within each unit.

Floodplains, Tidal Plains and Natural Levees

The floodplains and natural levees are along the major rivers, including the Susitna, Yentna, Skwentna, Kahiltna, Beluga and McArthur rivers. Small areas are also along streams such as Kroto, Lake, Peters, Alexander and Nikolai creeks.

The major rivers in the area are glacial in origin and seasonally transport a heavy silt load. In areas where the flood plain is not bedrock-controlled, the flood plain is a mass of braided channels. Overflow

water during spring break-up fills the secondary channels and floods the river bottom. The floodplains of the major rivers range from about several hundred feet up to three miles in width. Channels meander throughout the flood plain and major channels change location annually due to the cutting action of the high volume flow during the growing season. There are no artificial levees to protect areas from flooding. Elevation of the river channels ranges from about 700 feet (213 m) to sea level and tidal effects are seen along the streams adjacent to Cook Inlet. Many areas along the flood plain are affected by a high water table.

The alluvium that makes up the floodplains ranges from moderately fine textured to coarse textured, depending on the proximity of the area to the source of the material. Soils formed in organic matter are also found on floodplains. Adjacent to the river channel, the soils dominantly are sandy and gravelly, and the area contains many overflow channels to handle seasonal high water volumes. Progressing away from the river channel, the soils dominantly are silty and sandy deposits underlain by sandy and gravelly sediments. These soils often have a high water table.

The natural vegetation on the floodplains is cottonwood, white spruce and willows. Some areas, especially along small streams, support grasses and willows.

Soils of the floodplains and natural levees are the Susitna, Niklason, Hiline, Killey, Hewitt and Wasilla soils. These soils are distinguished mainly by the differences in thickness of the loamy surface layer to the sandy and gravelly material and the depth to the high water table. All of these soils formed in recent deposits and exhibit no soil development.

In tidal areas along Cook Inlet, the moderately fine and fine textured sediments are interlayered with organic matter and are subject to overflow from adjoining fresh water streams. Various old beach lines and high water marks can be seen on the shore.

The natural vegetation on the tidal plains is sedges and mosses. Driftwood is in the soil or on the surface in most areas.

Soils of the tidal plains are the Clunie soils and Cryaquents. Clunie soils are formed in organic matter overlying tidal sediments. The Cryaquents are formed in moderately fine textured tidal sediments which are subject to frequent tidal inundation.

Alluvial Fans and Terraces

The alluvial fans and terraces are adjacent to streams and rivers throughout the survey area, but the most extensive terraces occur in the eastern part of the area. The terraces generally range in width from about 100 feet (30 m) up to 4 miles (6.4 km) and may be up to about 9 miles (14.4 km) in length. The landforms are characterized by plane, dominantly gently sloping terrace slopes that may be interspersed with escarpments between the terrace levels. The alluvial fans are formed from the sediments deposited by streams as they erode through the landscape and enter onto the flood plain of another stream.

The source of most of the deposits is the glacial outwash from the adjoining mountain ranges. The granite, andesite and basalt bedrock formations provided the source material for the coarse fragments. The volcanic ash-influenced loess that mantles the entire survey area originated from the adjacent volcanic mountains and the glacial flour deposited in the major river bottoms.

Natural vegetation on the terraces and alluvial fans consists of white spruce and paper birch forests with grass and alder understory. These well drained soils are the most productive in the survey area.

Soils of the alluvial fans and terraces are the Chedatna, Homestead, Kashwitna, Lucile, Nancy and Schrock soils. Except for the poorly drained Lucile soils, these soils are well drained. These soils formed in a mantle of volcanic ash-influenced loess deposited over sandy and gravelly sediments. Chedatna and Schrock soils are on younger terraces. Chedatna soils have developed a cambic horizon and Schrock soils have developed a weakly expressed spodic horizon. Homestead, Kashwitna and Nancy soils are on older terraces and have well developed spodic horizons. Lucile soils are on older terraces, have developed a spodic horizon, and have a high water table.

Glacial Till Plains

The glacial till plains are between the alluvial plains and the mountainous uplands. This geomorphic unit occurs throughout the survey area and is the result of land shaping by glacial action and deposition of glacial materials. The landform is characterized by moraines, eskers and drumlins interspersed, and sometimes widely separated by, muskegs. The prominent relief forms generally are oriented in the direction of the advance and retreat of the glacier systems, as are the majority of the adjacent muskegs. Glacial erratics are found on and near the surface of the soil throughout the survey area and seem to be more numerous in the northern two-thirds of the area.

Soils on the convex landforms formed in a mantle of volcanic-ash influenced loess that was deposited

over the glacial till and outwash. Source material for the silty loess was silt sized particles on glacial stream floodplains and also volcanic ash from nearby intermittently active volcanoes. The loess material varies in thickness according to the proximity to source material and microclimatic conditions at the time of deposition. Soils formed in the loess mantle have formed spodic horizons. On the convex slopes, soils generally are well drained and support forest vegetation of spruce and birch with an understory of grass, alders and forbs. Loess soils on the footslopes generally have a high water table and exhibit similar development.

Soils on the convex landforms are the Kroto, Spenard and Strandline soils. Slikok soils formed in the mineral deposits in depressional areas on this landform. Kroto, Spenard and Strandline soils formed in loess over glacial till and have spodic horizons. Spenard soils also have a high water table. Slikok soils have a high water table, are formed in loess material over glacial till and exhibit slight development.

Soils in muskegs are formed in deposits of organic matter, dominantly mosses and sedges, that may be interlayered with strata of volcanic ash and loess. The muskegs occur in depressions that are underlain by firm glacial till which greatly restricts the downward movement of water and creates ponded areas. These areas support moss and sedge vegetation. Gradually the vegetation mat increases in thickness, filling in the depressions. Many areas contain open bodies of water that vary in size. The soils are very poorly drained and the water table generally is at or above the surface. Drainage in the depressional areas may be open or closed. These soils are young, and development is exhibited as degradation of the organic materials. There is no development in the mineral strata.

Chichantna, Doroshin, Salamatof, Starichkof and Tyonek soils (Figure 13) formed in muskegs. Water table for all of these soils is at or near the surface. Chichantna, Doroshin, Salamatof and Starichkof soils formed in moss and sedge organic matter with varying amounts of mineral strata. Tyonek soils, formed in deposits of moderately decomposed organic matter that derived from forest litter, contain thin strata of mineral material.

Mountainous Uplands

The mountainous uplands consists of foot slopes of the Alaska and Aleutian Mountain ranges which border the survey area and of mountains in the central part of the area which include Mt. Susitna, Beluga Mountain, Yenlo Hills, Willow Mountain and Peters Hills.

The soils on mountains of this unit formed dominantly in volcanic-ash influenced loess that was deposited over glacial till, and in some areas, over bedrock. The thickness of the loess mantle varies due to erosion of the loess and microclimatic conditions at the time of deposition. Elevation in these areas ranges to over 4,000 feet (1200m). The landform ranges from very steep mountainsides to sloping mountaintops and includes areas of exposed bedrock. Most soils are well drained, except where adjacent to stream drainages and in depressional areas. There, the firm glacial till restricts the downward movement of water and perches water in the loess layer. Below the alpine areas, the ground surface is smooth and generally convex. In the alpine areas, the surface is characterized by hummocks which are the result of severe frost churning of the soils. The hummocks are from 6 to 24 inches (13 to 61 cm) higher than the inter-hummock areas.

Natural vegetation in the grassland areas, below about 2,000 feet (600 m), is bluejoint grass with alders and forbs. In the alpine areas, vegetation includes lichens and mosses, with some prostrate shrubs, berries and forbs.

Soils in the grasslands are Puntilla and Kliskon and soils in the alpine areas are Chuit and Nakochna. These soils have formed spodic horizons as the result of leaching of iron and aluminum in the silty loess mantle.

Large amounts of organic matter are cycled into the soil system each growing season in the grassland areas. This results in the formation of a thick organic-rich surface layer in these soils as cool temperatures at these elevations restrict organic matter breakdown. In the alpine areas, severe frost heaving causes the mixing of soil horizons and the resulting integration of organic matter into the lower profile of the soil.

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Glossary

ABC soil. Soil having an A, a B, and a C horizon.

AC soil. Soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep rocky slopes.

Alluvial fan. A body of alluvium, with overflow of water and debris flow deposits, whose surface forms a segment of a cone that radiates downslope from the point where the stream emerges from a narrow valley onto a less sloping surface. Source uplands range in relief and area extent from mountains to gullied terrains on hill slopes.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Low.....0 to 3.75
Moderate.....3.75 to 7.5
High.....More than 7.5

Back slope. The geomorphic component that forms the steepest inclined surface and principal element of many hill slopes. Back slopes in profile are commonly steep and linear and descend to a foot slope. In terms of gradational process, back slopes are erosional forms produced mainly by mass wasting and running water.

Basal till. Compact glacial till deposited beneath the ice.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bedrock-controlled topography. A landscape where the configuration and relief of the landforms are determined or strongly influenced by the underlying bedrock.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Board foot. A unit of measure of the wood in lumber, logs, or trees. The amount of wood in a board one foot wide, one foot long, and one inch thick before finishing.

Boulders. Rock fragments larger than 2 feet (60 cm) in diameter.

Channeled. Refers to a drainage area in which natural meandering or repeated branching and convergence of a streambed have created deeply incised cuts, either active or abandoned, in alluvial material.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeters in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clayey soil. Silty clay, sandy clay, or clay.

Clearcut. A method of forest harvesting that removes the entire stand of trees in one cutting. Reproduction is achieved artificially or by natural seeding from adjacent stands.

Closed depression. A low area completely surrounded by higher ground and having no natural outlet.

Coarse fragments. Mineral or rock particles larger than 2 millimeters in diameter.

Coarse textured soil. Sand or loamy sand.

Cobble (or cobblestone). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 cm) in diameter.

Codominant trees. Trees whose crowns form the general level of the forest canopy and that receive full light from above but comparatively little from the sides.

Commercial forest. Forest land capable of producing 20 cubic feet or more per acre per year at the culmination of mean annual increment.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and

other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Conservation cropping system. Growing crops in combination with needed cultural and management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

Conservation tillage. Any tillage and planting system in which a cover of crop residue is maintained on at least 30 percent of the soil surface after planting in order to reduce the hazard of water erosion; in areas where soil blowing is the primary concern, a system that maintains a cover of at least 1,000 pounds of flat residue of small grain or the equivalent during the critical erosion period.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are:

Loose—Noncoherent when dry or moist; does not hold together in a mass.

Friable—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic—Readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky—Adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft—When dry, breaks into powder or individual grains under very slight pressure.

Cemented—Hard; little affected by moistening.

Contour stripcropping (or contour farming). Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Crop residue management. Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Culmination of the mean annual increment (CMAI). The average annual increase per acre in the volume of a stand. Computed by dividing the total volume of the stand by its age. As the stand increases in age, the mean annual increment continues to increase until mortality begins to reduce the rate of increase. The point where the stand reaches its maximum annual rate of growth is called the culmination of the mean annual increment.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deep soil. A soil that is 40 to 60 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Depth, soil. Generally, the thickness of soil over bedrock. Very deep soils are more than 60 inches deep over bedrock; deep soils, 40 to 60 inches; moderately deep, 20 to 40 inches; shallow, 10 to 20 inches; and very shallow, less than 20 inches.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Dominant trees. Trees whose crowns form the general level of the forest canopy and that receive full light from above and from the sides.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained—These soils have very high and high hydraulic conductivity and a low water-holding capacity. They are not suited to crop production unless irrigated.

Somewhat excessively drained—These soils have high hydraulic conductivity and a low water-holding capacity. Without irrigation, only a narrow range of crops can be grown and yields are low.
Well drained—These soils have an intermediate water-holding capacity. They retain optimum amounts of moisture, but they are not wet close enough to the surface or long enough during the growing season to adversely affect yields.
Moderately well drained—These soils are wet close enough to the surface or long enough that planting or harvesting operations or yields of some field crops are adversely affected unless a drainage system is installed. Moderately well drained soils commonly have a layer with low hydraulic conductivity, a wet layer relatively high in the profile, additions of water by seepage, or some combination of these.
Somewhat poorly drained—These soils are wet close enough to the surface or long enough that planting or harvesting operations or crop growth is markedly restricted unless a drainage system is installed. Somewhat poorly drained soils commonly have a layer with low hydraulic conductivity, a wet layer high in the profile, additions of water through seepage, or a combination of these.
Poorly drained—These soils commonly are so wet at or near the surface during a considerable part of the year that field crops cannot be grown under natural conditions. Poorly drained conditions are caused by a saturated zone, a layer with low hydraulic conductivity, seepage, or a combination of these.
Very poorly drained—These soils are wet to the surface most of the time. The wetness prevents the growth of important crops (except rice) unless a drainage system is installed.

Drainageway. An area of ground at a lower elevation than the surrounding ground and in which water collects and is drained to a closed depression or lake or to a drainageway at a lower elevation. A drainageway may or may not have distinctly incised channels at its upper reaches or throughout its course.

Drumlin. A low, smooth, elongated oval hill, mound, or ridge of compact glacial till. The longer axis is parallel to the path of the glacier and commonly has a blunt nose pointing in the direction from which the ice approached.

Dune. A mound, ridge, or hill of loose, windblown granular material (generally sand), either bare or covered with vegetation.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Escarpment. A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. The term is more often applied to cliffs resulting from differential erosion.

Esker. A long, narrow, sinuous, steep-sided ridge composed of irregularly stratified sand and gravel that were deposited by a subsurface stream flowing between ice walls or through ice tunnels of a retreating glacier and that were left behind when the ice melted. Eskers range from less than a mile to more than 100 miles in length and from 10 to 100 feet in height.

Even aged. Refers to a stand of trees in which only small differences in age occur between the individuals. A range of 20 years is allowed.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to inundation under flood-stage conditions unless protected artificially. It is usually a constructional landform built of sediment deposited during overflow and lateral migration of the stream.

Fluvial. Of or pertaining to rivers; produced by river action, as a fluvial plain.

Foot slope. The geomorphic component that forms the inner, gently inclined surface at the base of a hill slope. The surface profile is dominantly concave. In terms of gradational processes, a foot slope is a transition zone between an upslope site of erosion (back slope) and a downslope site of deposition (toe slope).

Forb. Any herbaceous plant not a grass or a sedge.

Frost action (in tables). Freezing and thawing of

soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Glacial drift (geology). Pulverized and other rock material transported by glacial ice and then deposited. Also, the sorted and unsorted material deposited by streams flowing from glaciers.

Glacial outwash (geology). Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.

Glacial till (geology). Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Glaciated uplands. Land areas that were previously covered by continental or alpine glaciers and that are at a higher elevation than the flood plain.

Glaciofluvial deposits (geology). Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur as kames, eskers, deltas, and outwash plains.

Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 cm) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 cm) in diameter.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gypsum. A mineral consisting of hydrous calcium sulfate.

Hard bedrock. Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

Heavy metal. Inorganic substances that are solid at ordinary temperatures and are not soluble in water. They form oxides and hydroxides that are basic. Examples are copper, iron, cadmium, zinc, manganese, lead, and arsenic.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric material and the more decomposed sapric material.

Hill. A natural elevation of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline; hillsides generally have slopes of more than 8 percent. The distinction between a hill and a mountain is arbitrary and is dependent on local usage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. The major horizons of mineral soil are as follows:

O horizon—An organic layer of fresh and decaying plant residue.

A horizon—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

B horizon—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

E horizon—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

C horizon—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the number 2 precedes the letter C.

Cr horizon—Sedimentary beds of consolidated sandstone and semiconsolidated and consolidated shale. Generally, roots can penetrate this horizon only along fracture planes.

R layer—Hard, consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Kame. A moundlike hill of glacial drift, composed chiefly of stratified sand and gravel.

Kame terrace. A terracelike ridge consisting of stratified sand and gravel that were deposited by a meltwater stream flowing between a melting

glacier and a higher valley wall or lateral moraine and that remained after the disappearance of the ice. It is commonly pitted with kettles and has an irregular ice-contact slope.

Lake plain. A surface marking the floor of an extinct lake, filled in by well sorted, stratified sediments.

Large stones (in tables). Rock fragments 3 inches (7.6 cm) or more across. Large stones adversely affect the specified use of the soil.

Lateral moraine. A ridgelike moraine carried on and deposited at the side margin of a valley glacier. It is composed chiefly of rock fragments derived from the valley walls by glacial abrasion and plucking or by mass wasting.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loamy soil. Coarse sandy loam, sandy loam, fine sandy loam, very fine sandy loam, loam, silt loam, silt, clay loam, sandy clay loam, or silty clay loam.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. The soil is not strong enough to support loads.

Mean annual increment (MAI). The average annual increase in volume of a tree during the entire life of the tree.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Merchantable trees. Trees that are of sufficient size to be economically processed into wood products.

Microhigh. An area that is 2 to 12 inches higher than the adjacent microlow.

Microlow. An area that is 2 to 12 inches lower than the adjacent microhigh.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Minor components. A component of limited extent that may not be present.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately deep soil. A soil that is 20 to 40 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Moraine. An accumulation of glacial drift in a topographic landform of its own, resulting chiefly from the direct action of glacial ice. Some types are lateral, recessional, and terminal.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mountain. A natural elevation of the land surface, rising more than 1,000 feet above surrounding lowlands, commonly of limited summit area and generally having steep sides (slopes greater than 25 percent) and considerable bare-rock surface. A mountain can occur as a single, isolated mass or in a group forming a chain or range. Mountains are primarily formed by deep-seated earth movements or volcanic action and secondarily by differential erosion.

Muck. Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Outwash plain. An extensive area of glaciofluvial material that was deposited by meltwater streams.

Overstory. The trees in a forest that form the upper crown cover.

Oxbow. The horseshoe-shaped channel of a former meander, remaining after the stream formed a cutoff across a narrow meander neck.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square m to 10 square m), depending on the variability of the soil.

Percs slowly (in tables). The slow movement of water through the soil, adversely affecting the specified use.

Permafrost. Layers of soil, or even bedrock, occurring in arctic or subarctic regions, in which a temperature below freezing has existed continuously for a long time.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow.....Less than 0.06 inch
Slow.....0.06 to 0.2 inch
Moderately slow.....0.2 to 0.6 inch
Moderate.....0.6 inch to 2.0 inches
Moderately rapid.....2.0 to 6.0 inches
Rapid.....6.0 to 20 inches
Very rapid.....More than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

Pitting (in tables). Pits caused by melting ground ice. They form on the soil after plant cover is removed.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Ponding. Standing water on soils in closed depressions. The water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid permeability or an impermeable layer near the surface, the soil may not adequately filter effluent from a waste disposal system.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity. expressed as pH values, are:

Ultra acid.....Below 3.5
Extremely acid.....3.5 to 4.5
Very strongly acid.....4.5 to 5.0
Strongly acid.....5.1 to 5.5
Medium acid.....5.6 to 6.0
Slightly acid.....6.1 to 6.5
Neutral.....6.6 to 7.3
Mildly alkaline.....7.4 to 7.8
Moderately alkaline.....7.9 to 8.4
Strongly alkaline.....8.5 to 9.0
Very strongly alkaline.....9.1 and higher

Recessional moraine. A moraine formed during a temporary but significant halt in the retreat of a glacier.

Regeneration. The new growth of a natural plant community, developing from seed.

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Riser. The relatively short, steeply sloping area below a terrace tread that grades to a lower terrace tread or base level.

Riverwash. Unstable areas of sandy, silty, clayey, or gravelly sediments. These areas are flooded, washed, and reworked by rivers so frequently that they support little or no vegetation.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rock outcrop. Exposures of bare bedrock other than lava flows and rock-lined pits.

Rubbleland. Areas that have more than 90 percent of the surface covered by stones or boulders. Voids contain no soil material and virtually no vegetation other than lichens. The areas commonly are at the base of mountain slopes, but some are on mountain slopes as deposits of cobbles, stones, and boulders left by Pleistocene glaciation or by periglacial phenomena.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeters to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandy soil. Sand or loamy sand.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Sawlogs. Logs of suitable size and quality for the production of lumber.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shallow soil. A soil that is 10 to 20 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Shelterwood system. A forest management system requiring the removal of a stand in a series of cuts so that regeneration occurs under a partial canopy. After regeneration, a final cut removes the shelterwood and allows the stand to develop in the open as an even-aged stand. The system is well suited to sites where shelter is needed for regeneration, and it can aid regeneration of the more intolerant tree species in a stand.

Shoulder slope. The uppermost inclined surface at the top of a hillside. It is the transition zone from the back slope to the summit of a hill or mountain. The surface is dominantly convex in profile and erosional in origin.

Shrink-swell (in tables). The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeters) to the lower limit of very fine sand (0.05 millimeters). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant or dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.

Skid trails. Pathways along which logs are dragged to a common site for loading onto a logging truck.

Slash. The branches, bark, treetops, reject logs, and broken or uprooted trees left on the ground after logging.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance. In this survey the following slope classes are recognized:

Nearly level.....0 to 3 percent
Gently sloping.....3 to 7 percent
Moderately sloping.....7 to 12 percent
Strongly sloping.....12 to 20 percent
Moderately steep.....20 to 30 percent
Steep.....30 to 45 percent

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Small stones (in tables). Rock fragments less than 3 inches (7.6 cm) in diameter. Small stones adversely affect the specified use of the soil.

Soft bedrock. Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Species. A single, distinct kind of plant or animal having certain distinguishing characteristics.

Spodic. The spodic horizon is one in which the active amorphous materials composed of organic matter and aluminum, with or without iron, have precipitated. The term "active" describes material that has high exchange capacity, large surface area, and high water retention. The horizon forms in coarse-textured parent materials and usually lies below an eluvial material horizon.

Stream channel. The hollow bed where a natural stream of surface water flows or may flow; the deepest or central part of the bed, formed by the main current and covered more or less continuously by water.

Stream terrace. One of a series of platforms in a stream valley, flanking and more or less parallel to the stream channel. It originally formed near the level of the stream and is the dissected remnants of an abandoned flood plain, streambed, or valley floor that were produced during a former stage of erosion or deposition.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are: *platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular),

and *granular*. *Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Substratum. The part of the soil below the solum.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Subsurface layer. Technically, the E horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Summit. A general term for the top, or highest level, of an upland feature, such as a hill or mountain. It commonly refers to a higher area that has a gentle slope and is flanked by steeper slopes.

Surface soil. The A, E, AB, and EB horizons. It includes all subdivisions of these horizons.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terminal moraine. A belt of thick glacial drift that generally marks the termination of important glacial advances. It commonly is a massive arcuate ridge or complex of ridges underlain by till and other types of drift.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Till plain. An extensive nearly level to gently rolling or moderately sloping area that is underlain by or consists of till and that has a slope of 0 to 8 percent.

Toe slope. The outermost inclined surface at the base of a hill. Toe slopes are commonly gentle and linear in profile.

Trafficability. The degree to which a soil is capable of supporting vehicular traffic across a wide range in soil moisture conditions.

Tread. The relatively flat terrace surface that was cut or built by stream or wave action.

Understory. Any plants in a forest community that grow to a height of less than 5 feet.

Unstable fill (in tables). Risk of caving or sloughing on banks of fill material.

Valley. An elongated depressional area primarily developed by stream action.

Variant, soil. A soil having properties sufficiently different from those of other known soils to justify a new series name, but occurring in such a limited geographic area that creation of a new series is not justified.

Very deep soil. A soil that is more than 60 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Very shallow soil. A soil that is less than 10 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Waterspreading. Diverting runoff from natural channels by means of a system of dams, dikes, or ditches and spreading it over relatively flat surfaces.

Windthrow. The action of uprooting and tipping over trees by the wind.

Tables

TABLE 1— TEMPERATURE AND PRECIPITATION

(Recorded in the period 1949-1990 at Skwentna, Alaska)

	Temperature (Degrees F.)						Precipitation (Inches)				
				2 yrs in 10 will have				2 yrs in 10 will have		avg # of	
Month	avg daily max	avg daily min	avg	max temp. >than	min temp. <than	avg # of grow deg days*	avg	less than	more than	days w/.1 or more	avg total snow fall
January	16.1	-3.5	6.3	39	-46	0	2.25	0.78	3.47	6	22.4
February	22.2	-0.8	10.7	41	-39	0	1.67	0.80	2.69	4	17.4
March	33.6	8.5	21.1	48	-28	0	1.15	0.44	2.03	3	12.3
April	43.9	22.5	33.2	58	-5	8	0.88	0.27	1.37	3	5.7
May	56.6	33.8	45.2	75	18	160	1.26	0.56	1.85	4	0.1
June	65.9	42.9	54.4	82	30	404	1.60	0.70	2.36	5	0.0
July	69.8	46.7	58.3	86	27	545	2.34	1.39	3.18	6	0.0
August	65.4	44.6	55.0	80	29	437	3.65	2.23	4.93	9	0.0
September	55.6	36.2	45.9	69	14	188	4.12	2.64	5.45	10	0.5
October	39.2	23.2	31.2	57	-6	10	3.41	1.94	4.71	7	12.4
November	24.5	8.9	16.7	42	-25	0	2.26	0.83	3.46	5	17.4
December	16.1	-1.1	7.5	37	-39	0	2.83	1.13	4.25	6	26.3
Yearly :											
Average	42.4	21.8	32.1	---	---	---	----	----	----	---	---
Extreme	89	-52	---	90	-46	---	----	----	----	---	---
Total	---	---	---	---	---	1753	27.39	12.15	31.23	68	114.4

Average # of days per year with at least 1 inch of snow on the ground: 164

*A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (Threshold : 40.0 deg. F)

TABLE 1— TEMPERATURE AND PRECIPITATION— Continued

(Recorded in the period 1981-1994 at Hayes River, Alaska)

Month	Temperature (Degrees F.)						Precipitation (Inches)				
	avg daily max	avg daily min	avg	2 yrs in 10 will have max temp. >than	2 yrs in 10 will have min temp. <than	avg # of grow deg days*	avg	2 yrs in 10 will have less than	2 yrs in 10 will have more than	avg # of days w/.1 or more	avg total snow fall
January	21.5	7.3	14.4	38	-27	0	4.78	2.25	6.96	8	50.8
February	24.2	5.3	14.8	42	-22	0	2.43	0.94	3.67	5	26.2
March	32.5	12.5	22.5	47	-16	0	2.27	0.72	3.85	5	27.9
April	40.2	20.6	30.4	54	-6	3	1.36	0.37	2.15	3	10.0
May	52.4	32.0	42.2	71	19	104	1.51	0.67	2.22	5	1.4
June	64.4	41.7	53.1	81	30	387	1.50	0.82	2.10	3	0.0
July	67.2	47.5	57.4	81	38	536	2.20	1.38	2.95	6	0.0
August	62.4	44.7	53.6	78	30	413	4.39	2.52	6.05	10	0.0
September	52.3	35.1	43.7	65	16	141	4.88	3.39	6.25	10	1.0
October	37.6	22.2	29.9	50	-1	4	3.92	1.84	5.71	8	10.8
November	24.6	8.6	16.6	41	-16	0	2.90	1.36	4.23	6	36.0
December	22.5	8.8	15.6	37	-16	0	5.52	2.80	7.89	11	61.0
Yearly :											
Average	41.8	23.9	32.8	---	---	---	----	----	----	---	---
Extreme	89	-34	---	83	-27	---	----	----	----	---	---
Total	---	---	---	---	---	1586	37.66	29.96	43.55	80	225.1

Average # of days per year with at least 1 inch of snow on the ground: 212

*A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (Threshold : 40.0 deg. F)

TABLE *2*— FREEZE DATES IN SPRING AND FALL

(Recorded in the period 1981-1994 at Hayes River, Alaska)

Probability	Temperature		
	24F or lower	28F or lower	32F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	May 16	June 2	June 13
2 year in 10 later than--	May 11	May 28	June 9
5 year in 10 later than--	May 2	May 17	June 2
First freezing temperature in fall:			
1 yr in 10 earlier than--	September 15	September 3	August 19
2 yr in 10 earlier than--	September 19	September 7	August 24
5 yr in 10 earlier than--	September 27	September 15	September 3

TABLE 2— FREEZE DATES IN SPRING AND FALL— Continued

(Recorded in the period 1949-1990 at Skwentna, Alaska)

Probability	Temperature		
	24F or lower	28F or lower	32F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	May 31	June 11	June 24
2 year in 10 later than--	May 22	June 4	June 16
5 year in 10 later than--	May 4	May 21	June 3
First freezing temperature in fall:			
1 yr in 10 earlier than--	September 12	August 22	August 19
2 yr in 10 earlier than--	September 17	August 29	August 23
5 yr in 10 earlier than--	September 27	September 11	September 1

TABLE 3— GROWING SEASON

(Recorded in the period 1981-1994 at Hayes River, Alaska)

	Daily Minimum Temperature		
Probability	# days > 24F	# days > 28F	# days > 32F
9 years in 10	126	104	71
8 years in 10	134	110	78
5 years in 10	149	121	92
2 years in 10	164	132	105
1 year in 10	171	137	112

TABLE 3— GROWING SEASON— Continued

(Recorded in the period 1949-1990 at Skwentna, Alaska)

	Daily Minimum Temperature		
Probability	# days > 24F	# days > 28F	# days > 32F
9 years in 10	110	86	67
8 years in 10	122	96	76
5 years in 10	145	116	92
2 years in 10	168	135	108
1 year in 10	180	145	116

TABLE 4— ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
201	Beaches	1,058	*
202	Chedatna silt loam, 0 to 2 percent slopes	14,951	0.5
203	Chichantna peat, 0 to 8 percent slopes	133,732	4.2
204	Chuit-Nakochna-Chichantna complex, 2 to 7 percent slopes	11,405	0.4
205	Chuit-Nakochna-Rubble land complex, 7 to 45 percent slopes	91,475	2.8
206	Chuit and Nakochna silt loams, 3 to 30 percent slopes	144,472	4.5
207	Clunie peat, 0 to 2 percent slopes	25,930	0.8
208	Doroshin peat, 0 to 5 percent slopes	53,439	1.7
209	Cryaquents, tidal	20,768	0.6
210	Glaciers	18,175	0.6
211	Hewitt peat, 0 to 2 percent slopes	85,608	2.7
212	Histic pergelic cryaquepts-Starichkof complex, 0 to 7 percent slopes	11,684	0.4
213	Homestead silt loam, 0 to 2 percent slopes	5,873	0.2
214	Killey and Hiline silt loams, 0 to 2 percent slopes	160,495	5.0
215	Kliskon silt loam, 2 to 12 percent slopes	29,294	0.9
216	Kroto-Strandline-Cryorthents complex, 30 to 45 percent slopes	89,695	2.8
217	Lucile silt loam, 0 to 2 percent slopes	20,562	0.6
218	Nancy-Kashwitna complex, 0 to 2 percent slopes	91,756	2.9
219	Nancy-Kashwitna complex, 2 to 7 percent slopes	44,117	1.4
220	Nancy-Kashwitna complex, 7 to 12 percent slopes	8,947	0.3
221	Nancy-Kashwitna complex, 12 to 20 percent slopes	4,086	0.1
222	Nancy-Kashwitna complex, 20 to 30 percent slopes	1,831	0.1
223	Nancy-Kashwitna complex, 30 to 45 percent slopes	4,570	0.1
224	Nancy-Kashwitna complex, cool, 0 to 7 percent slopes	20,407	0.6
225	Niklason silt loam, 0 to 2 percent slopes	19,591	0.6
226	Puntilla silt loam, 7 to 20 percent slopes	109,993	3.4
227	Puntilla silt loam, 20 to 30 percent slopes	58,596	1.8
228	Puntilla silt loam, 30 to 45 percent slopes	68,369	2.1
229	Riverwash	31,305	1.0
230	Rubble land	125,202	3.9
231	Salamatof peat, 0 to 2 percent slopes	199,002	6.2
232	Schrock silt loam, 0 to 2 percent slopes	25,504	0.8
233	Slikok muck, 0 to 5 percent slopes	56,351	1.8
234	Slikok-Starichkof-Strandline complex, 0 to 7 percent slopes	10,852	0.3
235	Spenard silt loam, 0 to 7 percent slopes	80,416	2.5
236	Starichkof peat, 0 to 7 percent slopes	255,775	8.0
237	Strandline-Kroto complex, 20 to 45 percent slopes	95,550	3.0
238	Strandline-Kroto-Chichantna complex, 1 to 20 percent slopes	35,860	1.1
239	Strandline-Kroto-Slikok complex, 1 to 12 percent slopes	29,405	0.9
240	Strandline-Spenard-Kroto complex, 2 to 30 percent slopes	712,542	22.2
241	Suntrana silt loam, 2 to 7 percent slopes	6,138	0.2
242	Susitna-Niklason silt loams, 0 to 2 percent slopes	44,623	1.4
243	Susitna and Niklason silt loams, 0 to 2 percent slopes	11,176	0.3
244	Tyonek peat, 0 to 2 percent slopes	4,429	0.1
245	Wasilla silt loam, 0 to 2 percent slopes	16,255	0.5
W	Water	122,388	3.8
	Total	3,213,652	100.0

* Less than 0.1 percent.

TABLE 5— WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Ordination symbol	Management concerns					Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Productivity class*	
202---------- Chedatna	2A	Slight	Slight	Slight	Slight	Moderate	White spruce--------	74	2	White spruce.
216**: Kroto.										
Strandline--------	2R	Severe	Severe	Slight	Moderate	Slight	White spruce--------	70	2	White spruce.
Cryorthents.										
218**, 219**, 220**: Nancy----------	2A	Slight	Moderate	Slight	Moderate	Severe	White spruce-------- Paper birch--------- Quaking aspen------- Black spruce--------	76 49 53 ---	2 1 3 --	White spruce, paper birch.
Kashwitna--------	2A	Slight	Moderate	Slight	Moderate	Moderate	White spruce-------- Paper birch--------- Quaking aspen------- Black spruce--------	69 50 52 ---	2 2 3 --	White spruce, paper birch.
221**, 222**: Nancy----------	2R	Moderate	Moderate	Slight	Moderate	Severe	White spruce-------- Paper birch--------- Quaking aspen------- Black spruce--------	76 49 53 ---	2 1 3 --	White spruce, paper birch.
Kashwitna---------	2R	Moderate	Moderate	Slight	Moderate	Moderate	White spruce-------- Paper birch--------- Quaking aspen------- Black spruce--------	69 50 52 ---	2 2 3 --	White spruce, paper birch.

See footnote at end of table.

TABLE 5— WOODLAND MANAGEMENT AND PRODUCTIVITY— Continued

Soil name and map symbol	Ordination symbol	Management concerns					Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Wind-throw hazard	Plant competition	Common trees	Site index	Productivity class*	
223**:										
Nancy	2R	Severe	Severe	Slight	Moderate	Severe	White spruce	76	2	White spruce, paper birch.
							Paper birch	49	1	
							Quaking aspen	53	3	
							Black spruce	---	--	
Kashwitna	2R	Severe	Severe	Slight	Moderate	Moderate	White spruce	69	2	White spruce, paper birch.
							Paper Birch	50	2	
							Quaking aspen	52	3	
							Black spruce	---	--	
224**:										
Nancy	2A	Slight	Moderate	Slight	Moderate	Severe	White spruce	76	2	White spruce, paper birch.
							Paper birch	49	1	
							Quaking aspen	53	3	
							Black spruce	---	--	
Kashwitna	2A	Slight	Moderate	Slight	Moderate	Moderate	White spruce	69	2	White spruce, paper birch.
							Paper birch	50	2	
							Quaking aspen	52	3	
							Black spruce	---	--	
225 Niklason	2A	Slight	Moderate	Moderate	Moderate	Moderate	White spruce	72	2	White spruce, paper birch, balsam poplar
							Paper birch	47	1	
							Balsam poplar	72	--	
232 Schrock	1A	Slight	Moderate	Slight	Moderate	Severe	White spruce	63	1	White spruce.
234**:										
Slikok.										
Starichkof.										
Strandline	2A	Slight	Slight	Slight	Moderate	Slight	White spruce	70	2	White spruce.
237**:										
Strandline	2R	Severe	Severe	Slight	Moderate	Slight	White spruce	70	2	White spruce.
Kroto.										

See footnote at end of table.

TABLE 5— WOODLAND MANAGEMENT AND PRODUCTIVITY— Continued

Soil name and map symbol	Ordination symbol	Management concerns					Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Wind-throw hazard	Plant competition	Common trees	Site index	Productivity class*	
238**:										
Strandline	2A	Moderate	Moderate	Slight	Moderate	Slight	White spruce	70	2	White spruce.
Kroto.										
Chichantna.										
239**:										
Strandline	2A	Slight	Slight	Slight	Moderate	Slight	White spruce	70	2	White spruce.
Kroto.										
Slikok.										
240**:										
Strandline	2R	Moderate	Moderate	Slight	Moderate	Slight	White spruce	70	2	White spruce.
240**:										
Spenard.										
Kroto.										
242**:										
Susitna	2A	Slight	Slight	Slight	Moderate	Moderate	White spruce	70	2	White spruce.
							Paper birch	42	1	
							Balsam poplar	---	--	
Niklason	2A	Slight	Slight	Slight	Moderate	Moderate	White spruce	72	2	White spruce, paper
							Paper birch	46	1	birch, balsam poplar.
							Balsam poplar	72	--	
243**:										
Susitna	2W	Slight	Moderate	Slight	Moderate	Moderate	White spruce	70	2	White spruce.
							Paper birch	42	1	
							Balsam poplar	--	--	
Niklason	2W	Slight	Moderate	Slight	Moderate	Moderate	White spruce	72	2	White spruce, paper
							Paper birch	47	1	birch, balsam poplar.
							Balsam poplar	72	--	

* Productivity class is the yield in cubic m per hectare per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 6— RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Paths and trails
201*. Beaches		
202---------- Chedatna	Severe: flooding.	Slight.
203---------- Chichantna	Severe: wetness, excess humus.	Severe: wetness, excess humus.
204*: Chuit----------	Moderate: percs slowly.	Severe: erodes easily.
Nakochna----------	Severe: depth to rock.	Severe: erodes easily.
Chichantna----------	Severe: wetness, excess humus.	Severe: wetness, excess humus.
205*: Chuit----------	Severe: slope.	Severe: slope, erodes easily.
Nakochna----------	Severe: slope, depth to rock.	Severe: slope, erodes easily.
Rubble land----------	Severe: slope, small stones.	Severe: large stones, slope, small stones.
206*: Chuit----------	Severe: slope.	Severe: erodes easily.
Nakochna----------	Severe: slope, Depth to rock.	Severe: erodes easily.
207---------- Clunie	Severe: flooding, ponding, Excess humus.	Severe: ponding, excess humus.
208---------- Doroshin	Severe: wetness, excess humus.	Severe: wetness, excess humus.
209---------- Cryaquents, tidal	Severe: flooding, wetness.	Severe: wetness.

See footnote at end of table.

TABLE 6— RECREATIONAL DEVELOPMENT— Continued

Soil name and map symbol	Camp areas	Paths and trails
210*---------- Glaciers	Severe: permafrost, slope.	Severe: permafrost, slope.
211---------- Hewitt	Severe: flooding, wetness, Excess humus.	Severe: wetness, excess humus.
212*: Histic pergelic cryaquepts----------	Severe: wetness, excess humus.	Severe: wetness, excess humus.
Starichkof----------	Severe: ponding, excess humus.	Severe: ponding, excess humus.
213---------- Homestead	Slight----------	Slight.
214*: Killey----------	Severe: flooding, wetness.	Severe: wetness.
Hiline----------	Severe: flooding, wetness.	Severe: wetness.
215---------- Kliskon	Moderate: wetness, Percs slowly.	Severe: erodes easily.
216*: Kroto----------	Severe: slope.	Severe: slope, erodes easily.
Strandline----------	Severe: slope.	Severe: slope, erodes easily.
Cryorthents----------	Severe: slope.	Severe: slope, erodes easily.
217---------- Lucile	Moderate: wetness.	Severe: erodes easily.
218*: Nancy----------	Slight----------	Severe: erodes easily.
Kashwitna----------	Slight----------	Severe: erodes easily.

See footnote at end of table.

TABLE 6— RECREATIONAL DEVELOPMENT— Continued

Soil name and map symbol	Camp areas	Paths and trails
219*:		
Nancy	Slight	Severe: erodes easily.
Kashwitna	Slight	Severe: erodes easily.
220*:		
Nancy	Moderate: slope.	Severe: erodes easily.
Kashwitna	Moderate: slope.	Severe: erodes easily.
221*:		
Nancy	Severe: slope.	Severe: erodes easily.
Kashwitna	Severe: slope.	Severe: erodes easily.
222*, 223*:		
Nancy	Severe: slope.	Severe: slope, erodes easily.
Kashwitna	Severe: slope.	Severe: slope, erodes easily.
224*:		
Nancy	Slight	Severe: erodes easily.
Kashwitna	Slight	Severe: erodes easily.
225---------- Niklason	Severe: flooding.	Severe: erodes easily.
226---------- Puntilla	Moderate: slope, percs slowly.	Severe: erodes easily.
227, 228---------- Puntilla	Severe: slope.	Severe: slope, erodes easily.
229*. Riverwash		
230*---------- Rubble land	Severe: slope, small stones.	Severe: large stones, slope, small stones.

See footnote at end of table.

TABLE 6— RECREATIONAL DEVELOPMENT— Continued

Soil name and map symbol	Camp areas	Paths and trails
231---------- Salamatof	Severe: ponding, excess humus, Too acid.	Severe: ponding, excess humus.
232---------- Schrock	Severe: flooding.	Slight.
233---------- Slikok	Severe: ponding, excess humus.	Severe: ponding, excess humus.
234*: Slikok----------	Severe: ponding, excess humus.	Severe: ponding, excess humus.
Starichkof----------	Severe: ponding, excess humus.	Severe: ponding, excess humus.
Strandline----------	Moderate: percs slowly.	Severe: erodes easily.
235---------- Spenard	Severe: wetness.	Severe: wetness, erodes easily.
236---------- Starichkof	Severe: ponding, excess humus.	Severe: ponding, excess humus.
237*: Strandline----------	Severe: slope.	Severe: slope, erodes easily.
Kroto----------	Severe: slope.	Severe: slope, erodes easily.
238*: Strandline----------	Moderate: slope, percs slowly.	Severe: erodes easily.
Kroto----------	Moderate: slope, percs slowly.	Severe: erodes easily.
Chichantna----------	Severe: wetness, excess humus.	Severe: wetness, excess humus.
239*: Strandline----------	Moderate: percs slowly.	Severe: erodes easily.

See footnote at end of table.

TABLE 6— RECREATIONAL DEVELOPMENT— Continued

Soil name and map symbol	Camp areas	Paths and trails
239*:		
Kroto	Moderate: percs slowly.	Severe: erodes easily.
Slikok	Severe: ponding, excess humus.	Severe: ponding, excess humus.
240*:		
Strandline	Severe: slope.	Severe: erodes easily.
Spenard	Severe: wetness.	Severe: wetness, erodes easily.
Kroto	Severe: slope.	Severe: erodes easily.
241 Suntrana	Severe: wetness, percs slowly.	Moderate: wetness.
242*:		
Susitna	Severe: flooding.	Slight.
Niklason	Severe: flooding.	Severe: erodes easily.
243*:		
Susitna	Severe: flooding.	Moderate: flooding.
Niklason	Severe: flooding.	Severe: erodes easily.
244 Tyonek	Severe: wetness, excess humus.	Severe: wetness, excess humus.
245 Wasilla	Severe: flooding, wetness.	Moderate: wetness, flooding.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7— BUILDING SITE DEVELOPMENT AND SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Local roads and streets	Trench sanitary landfill	Area sanitary landfill
201*---------- Beaches	Severe: cutbanks cave, wetness.	Severe: flooding, Wetness.	Severe: wetness, flooding.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.
202---------- Chedatna	Severe: cutbanks cave.	Severe: Flooding.	Moderate: flooding, frost action.	Severe: seepage, wetness, too sandy.	Severe: seepage.
203---------- Chichantna	Severe: excess humus, wetness.	Severe: subsides, Wetness, low strength.	Severe: subsides, wetness, frost action.	Severe: seepage, wetness, excess humus.	Severe: seepage, wetness.
204*: Chuit----------	Slight---------	Slight----------	Severe: frost action.	Slight----------	Slight.
Nakochna--------	Severe: depth to rock.	Severe: Depth to rock.	Severe: depth to rock, frost action.	Severe: depth to rock.	Severe: depth to rock.
Chichantna------	Severe: excess humus, wetness.	Severe: subsides, wetness, low strength.	Severe: subsides, wetness, frost action.	Severe: seepage, wetness, excess humus.	Severe: seepage, wetness.
205*: Chuit----------	Severe: slope.	Severe: Slope.	Severe: slope, frost action.	Severe: slope.	Severe: slope.
Nakochna--------	Severe: depth to rock, slope.	Severe: slope, Depth to rock.	Severe: depth to rock, slope, frost action.	Severe: depth to rock, slope.	Severe: depth to rock, slope.
Rubble land-----	Severe: large stones, slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: depth to rock, seepage.	Severe: seepage.
206*: Chuit----------	Severe: slope.	Severe: slope.	Severe: slope, frost action.	Severe: slope.	Severe: slope.
Nakochna--------	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope, frost action.	Severe: depth to rock, slope.	Severe: depth to rock, slope.
207---------- Clunie	Severe: cutbanks cave, excess humus, ponding.	Severe: subsides, flooding, ponding.	Severe: subsides, ponding, flooding.	Severe: flooding, ponding, too sandy.	Severe: flooding, seepage, Ponding.

See footnote at end of table.

TABLE 7— BUILDING SITE DEVELOPMENT AND SANITARY FACILITIES— Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Local roads and streets	Trench sanitary landfill	Area sanitary landfill
208---------- Doroshin	Severe: excess humus, wetness.	Severe: subsides, wetness, low strength.	Severe: subsides, wetness.	Severe: wetness, excess humus.	Severe: seepage, Wetness.
209---------- Cryaquents,tidal	Severe: wetness.	Severe: flooding, wetness.	Severe: wetness, flooding, frost action.	Severe: flooding, wetness.	Severe: flooding, Wetness.
210*---------- Glaciers	Severe: permafrost, slope.	Severe: permafrost, slope.	Severe: permafrost, slope.	Severe: permafrost, slope.	Severe: permafrost, slope.
211---------- Hewitt	Severe: excess humus, wetness.	Severe: flooding, wetness, low strength.	Severe: wetness, flooding, frost action.	Severe: flooding, wetness.	Severe: flooding, seepage, wetness.
212*: Histic pergelic cryaquepts-----	Severe: wetness.	Severe: wetness, low strength.	Severe: wetness, frost action.	Severe: seepage, wetness, excess humus.	Severe: wetness.
Starichkof------	Severe: excess humus, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, frost action.	Severe: seepage, ponding, excess humus.	Severe: seepage, ponding.
213---------- Homestead	Severe: cutbanks cave.	Slight----------	Slight---------	Severe: seepage, too sandy.	Severe: seepage.
214*: Killey----------	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding, frost action.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.
Hiline----------	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding, frost action.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness.
215---------- Kliskon	Severe: wetness.	Moderate: wetness.	Severe: frost action.	Severe: wetness.	Severe: wetness.
216*: Kroto----------	Severe: slope.	Severe: slope.	Severe: slope, frost action.	Severe: slope.	Severe: slope.
Strandline------	Severe: slope.	Severe: slope.	Severe: slope, frost action.	Severe: slope.	Severe: slope.
Cryorthents-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.

See footnote at end of table.

TABLE 7— BUILDING SITE DEVELOPMENT AND SANITARY FACILITIES— Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Local roads and streets	Trench sanitary landfill	Area sanitary landfill
217---------- Lucile	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: frost action.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.
218*: Nancy----------	Severe: cutbanks cave.	Slight----------	Severe: frost action.	Severe: seepage, too sandy.	Severe: seepage.
Kashwitna-------	Severe: cutbanks cave.	Slight----------	Severe: frost action.	Severe: seepage, too sandy	Severe: seepage.
219*: Nancy----------	Severe: cutbanks cave.	Slight----------	Severe: frost action.	Severe: seepage, too sandy.	Severe: seepage.
Kashwitna-------	Severe: cutbanks cave.	Slight----------	Severe: frost action.	Severe: seepage, too sandy.	Severe: seepage.
220*: Nancy----------	Severe: cutbanks cave.	Moderate: slope.	Severe: frost action.	Severe: seepage, too sandy.	Severe: seepage.
Kashwitna-------	Severe: cutbanks cave.	Moderate: slope.	Severe: frost action.	Severe: seepage, too sandy.	Severe: seepage.
221*, 222*, 223*: Nancy----------	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope, frost action.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.
Kashwitna-------	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope, frost action.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.
224*: Nancy----------	Severe: cutbanks cave.	Slight----------	Severe: frost action.	Severe: seepage, too sandy.	Severe: seepage.
Kashwitna-------	Severe: cutbanks cave.	Slight----------	Severe: frost action.	Severe: seepage, too sandy.	Severe: seepage.
225---------- Niklason	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding, seepage, too sandy.	Severe: flooding, seepage.
226---------- Puntilla	Moderate: slope.	Moderate: slope.	Severe: frost action.	Moderate: slope.	Moderate: slope.

See footnote at end of table.

TABLE 7— BUILDING SITE DEVELOPMENT AND SANITARY FACILITIES— Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Local roads and streets	Trench sanitary landfill	Area sanitary landfill
227, 228-------- Puntilla	Severe: slope.	Severe: slope.	Severe: slope, frost action.	Severe: slope.	Severe: slope.
229*------------ Riverwash	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.
230*------------ Rubble land	Severe: large stones, slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: depth to rock, seepage.	Severe: seepage.
231------------- Salamatof	Severe: excess humus, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, frost action.	Severe: seepage, ponding, excess humus.	Severe: seepage, ponding.
232------------- Schrock	Severe: cutbanks cave.	Severe: flooding.	Severe: frost action.	Severe: seepage, too sandy.	Moderate: flooding.
233------------- Slikok	Severe: excess humus, ponding.	Severe: ponding, low strength.	Severe: low strength, ponding, frost action.	Severe: ponding, excess humus.	Severe: ponding.
234*: Slikok--------- Starichkof-----	Severe: excess humus, ponding. Severe: excess humus, ponding.	Severe: ponding, low strength. Severe: subsides, ponding, low strength.	Severe: low strength, ponding, frost action. Severe: subsides, ponding, frost action.	Severe: ponding, excess humus. Severe: seepage, ponding, excess humus.	Severe: ponding. Severe: seepage, ponding.
Strandline----- 235------------- Spenard	Slight---------- Severe: wetness.	Slight---------- Severe: wetness.	Severe: frost action. Severe: wetness, frost action.	Slight---------- Severe: wetness.	Slight. Severe: Wetness.
236------------- Starichkof	Severe: excess humus, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, frost action.	Severe: seepage, ponding, excess humus.	Severe: seepage, ponding.
237*: Strandline----- Kroto----------	Severe: slope. Severe: slope.	Severe: slope. Severe: slope.	Severe: slope, frost action. Severe: slope, frost action.	Severe: slope. Severe: slope.	Severe: slope. Severe: slope.
238*: Strandline-----	Moderate: slope.	Moderate: slope.	Severe: frost action.	Moderate: slope.	Moderate: slope.

See footnote at end of table

TABLE 7— BUILDING SITE DEVELOPMENT AND SANITARY FACILITIES— Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Local roads and streets	Trench sanitary landfill	Area sanitary landfill
238*:					
Kroto----------	Moderate: slope.	Moderate: slope.	Severe: frost action.	Moderate: slope.	Moderate: slope.
Chichantna-----	Severe: excess humus, wetness.	Severe: subsides, wetness, low strength.	Severe: subsides, wetness, frost action.	Severe: seepage, wetness, excess humus.	Severe: seepage, wetness.
239*:					
Strandline-----	Slight----------	Slight----------	Severe: frost action.	Slight--------	Slight.
Kroto----------	Slight----------	Slight----------	Severe: frost action.	Slight--------	Slight.
Slikok---------	Severe: excess humus, ponding.	Severe: ponding, low strength.	Severe: low strength, ponding, frost action.	Severe: ponding, excess humus.	Severe: ponding.
240*:					
Strandline-----	Severe: slope.	Severe: slope.	Severe: slope, frost action.	Severe: slope.	Severe: slope.
Spenard--------	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.	Severe: Wetness.
Kroto----------	Severe: slope.	Severe: slope.	Severe: slope, frost action.	Severe: slope.	Severe: slope.
241---------- Suntrana	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: shrink-swell, low strength, frost action.	Severe: wetness.	Severe: Wetness.
242*, 243*:					
Susitna--------	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding, seepage, too sandy.	Severe: flooding.
Niklason-------	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding, seepage, too sandy.	Severe: flooding, seepage.
244---------- Tyonek	Severe: excess humus, wetness.	Severe: wetness, low strength, subsides.	Severe: wetness, frost action, subsides.	Severe: wetness excess humus.	Severe: wetness.
245---------- Wasilla	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, frost action.	Severe: flooding, wetness.	Severe: flooding, Wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8— CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
201* Beaches	Poor: wetness.	Probable	Probable	Poor: too sandy, small stones, area reclaim.
202 Chedatna	Good	Probable	Improbable: too sandy.	Poor: too sandy, small stones.
203 Chichantna	Poor: wetness.	Improbable: excess humus.	Improbable: excess humus.	Poor: excess humus, wetness.
204*: Chuit	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
Nakochna	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones.
Chichantna	Poor: wetness.	Improbable: excess humus.	Improbable: excess humus.	Poor: excess humus, wetness.
205*: Chuit	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope.
Nakochna	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
Rubble land	Poor: large stones, slope.	Improbable: small stones, large stones.	Improbable: large stones.	Poor: area reclaim, small stones, slope.
206*: Chuit	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope.
Nakochna	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
207 Clunie	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness.

See footnote at end of table.

TABLE 8— CONSTRUCTION MATERIALS— Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
208-- Doroshin	Poor: wetness.	Improbable: excess humus.	Improbable: excess humus.	Poor: excess humus, wetness.
209-- Cryaquents,tidal	Poor: thin layer, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
210*-- Glaciers	Poor: permafrost, slope.	Improbable: permafrost, excess fines.	Improbable: permafrost, excess fines.	Poor: permafrost, slope.
211-- Hewitt	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness.
212*: Histic pergelic cryaquepts----	Poor: thin layer, wetness.	Improbable: excess humus.	Improbable: excess humus.	Poor: excess humus, wetness.
Starichkof----	Poor: wetness.	Improbable: excess humus.	Improbable: excess humus.	Poor: excess humus, wetness.
213-- Homestead	Good----	Probable----	Probable----	Poor: too sandy, small stones, area reclaim.
214*: Killey----	Poor: wetness.	Probable----	Probable----	Poor: too sandy, area reclaim, wetness.
Hiline----	Poor: wetness.	Probable----	Probable----	Poor: too sandy, small stones, area reclaim.
215-- Kliskon	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
216*: Kroto----	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Strandline----	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope.
Cryorthents----	Poor: thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.

See footnote at end of table.

TABLE 8— CONSTRUCTION MATERIALS— Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
217 Lucile	Fair: wetness.	Probable	Probable	Poor: too sandy, small stones.
218*, 219*, 220*: Nancy	Good	Probable	Probable	Poor: small stones, area reclaim.
Kashwitna	Good	Probable	Probable	Poor: too sandy, small stones, area reclaim.
221*: Nancy	Fair: slope.	Probable	Probable	Poor: small stones, area reclaim, slope.
Kashwitna	Fair: slope.	Probable	Probable	Poor: too sandy, small stones, area reclaim.
222*, 223*: Nancy	Poor: slope.	Probable	Probable	Poor: small stones, area reclaim, slope.
Kashwitna	Poor: slope.	Probable	Probable	Poor: too sandy, small stones, area reclaim.
224*: Nancy	Good	Probable	Probable	Poor: small stones, area reclaim.
Kashwitna	Good	Probable	Probable	Poor: too sandy, small stones, area reclaim.
225 Niklason	Good	Probable	Probable	Poor: too sandy, small stones, area reclaim.
226 Puntilla	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
227, 228 Puntilla	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope.

See footnote at end of table.

TABLE 8— CONSTRUCTION MATERIALS— Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
229* Riverwash	Poor: wetness.	Probable	Probable	Poor: too sandy, small stones, area reclaim.
230* Rubble land	Poor: large stones, slope.	Improbable: small stones, large stones.	Improbable: large stones.	Poor: area reclaim, small stones, slope.
231 Salamatof	Poor: wetness.	Improbable: excess humus.	Improbable: excess humus.	Poor: excess humus, wetness, too acid.
232 Schrock	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, area reclaim.
233 Slikok	Poor: wetness.	Improbable: excess humus.	Improbable: excess humus.	Poor: wetness.
234*: Slikok	Poor: wetness.	Improbable: excess humus.	Improbable: excess humus.	Poor: wetness.
Starichkof	Poor: wetness.	Improbable: excess humus.	Improbable: excess humus.	Poor: excess humus, wetness.
Strandline	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
235 Spenard	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
236 Starichkof	Poor: wetness.	Improbable: excess humus.	Improbable: excess humus.	Poor: excess humus, wetness.
237*: Strandline	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope.
Kroto	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
238*: Strandline	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
Kroto	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Chichantna	Poor: wetness.	Improbable: excess humus.	Improbable: excess humus.	Poor: excess humus, wetness.

See footnote at end of table.

TABLE 8— CONSTRUCTION MATERIALS— Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
239*:				
Strandline	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
Kroto	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Slikok	Poor: wetness.	Improbable: excess humus.	Improbable: excess humus.	Poor: wetness.
240*:				
Strandline	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope.
Spenard	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Kroto	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
241 Suntrana	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
242*, 243*:				
Susitna	Good	Probable	Probable	Poor: too sandy.
Niklason	Good	Probable	Probable	Poor: too sandy, small stones, area reclaim.
244 Tyonek	Poor: wetness.	Improbable: excess humus.	Improbable: excess humus.	Poor: excess humus, wetness.
245 Wasilla	Fair: shrink-swell, low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9— ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data was not estimated)

Soil name and map symbol	Depth	USDA texture	Classification		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	4	10	40	200		
	In								Pct	
201*---------- Beaches	0-6		GP, SP	A-1	50-80	50-75	5-40	0-5	---	NP
	6-60	Gravelly coarse sand, very gravelly coarse sand, extremely gravelly coarse sand.	GP, SP	A-1	10-80	10-75	0-40	0-5	---	NP
202---------- Chedatna	0-19	Silt loam--------	ML	A-4	100	100	95-100	65-80	30-40	NP-10
	19-60	Sand, gravelly sand, loamy sand.	SP-SM, SM	A-1, A-2	80-100	55-100	35-85	10-30	---	NP
203---------- Chichantna	0-6	Peat----------	PT	A-8	---	---	---	---	---	---
	6-28	Stratified hemic material to silt loam.	PT	A-8	---	---	---	---	---	---
	28-35	Silt loam, loam, fine sandy loam.	ML	A-4	100	100	95-100	65-75	30-40	NP-10
	35-64	Sapric material	PT	A-8	---	---	---	---	---	---
204*: Chuit----------	0-9	Silt loam--------	ML	A-5	100	90-100	85-100	60-80	40-50	NP-10
	9-33	Silt loam, very fine sandy loam.	ML	A-5	100	90-100	85-100	60-80	40-50	NP-10
	33-60	Silt loam, gravelly silt loam, loam.	GM, SM, ML	A-4	65-95	55-95	50-95	40-85	25-30	NP-5
Nakochna--------	0-3	Silt loam--------	ML	A-5	100	90-100	85-100	60-80	40-50	NP-10
	3-17	Silt loam, gravelly silt loam, very fine sandy loam.	SM, ML, GM	A-5	70-95	60-95	55-95	40-75	40-50	NP-10
	17	Unweathered bedrock.	---	---	---	---	---	---	---	---
Chichantna------	0-6	Peat----------	PT	A-8	---	---	---	---	---	---
	6-28	Stratified hemic material to silt loam.	PT	A-8	---	---	---	---	---	---
	28-35	Silt loam, loam, fine sandy loam.	ML	A-4	100	100	95-100	65-75	30-40	NP-10
	35-64	Sapric material	PT	A-8	---	---	---	---	---	---
205*: Chuit----------	0-9	Silt loam--------	ML	A-5	100	90-100	85-100	60-80	40-50	NP-10
	9-33	Silt loam, very fine sandy loam.	ML	A-5	100	90-100	85-100	60-80	40-50	NP-10
	33-60	Silt loam, gravelly silt loam, loam.	GM, SM, ML	A-4	65-95	55-95	50-95	40-85	25-30	NP-5

See footnote at end of table.

TABLE 9— ENGINEERING INDEX PROPERTIES— Continued

Soil name and map symbol	Depth	USDA texture	Classification		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	4	10	40	200		
	In								Pct	
205*:										
Nakochna	0-3	Silt loam	ML	A-5	100	90-100	85-100	60-80	40-50	NP-10
	3-17	Silt loam, gravelly silt loam, very fine sandy loam.	SM, ML, GM	A-5	70-95	60-95	55-95	40-75	40-50	NP-10
	17	Unweathered bedrock.	---	---	---	---	---	---	---	---
Rubble land	0-60		GP	A-1	0-10	0-5	0-5	0	---	NP
206*:										
Chuit	0-9	Silt loam	ML	A-5	100	90-100	85-100	60-80	40-50	NP-10
	9-33	Silt loam, very fine sandy loam.	ML	A-5	100	90-100	85-100	60-80	40-50	NP-10
	33-60	Silt loam, gravelly silt loam, loam.	GM, SM, ML	A-4	65-95	55-95	50-95	40-85	25-30	NP-5
Nakochna	0-3	Silt loam	ML	A-5	100	90-100	85-100	60-80	40-50	NP-10
	3-17	Silt loam, gravelly silt loam, very fine sandy loam.	SM, ML, GM	A-5	70-95	60-95	55-95	40-75	40-50	NP-10
	17	Unweathered bedrock.	---	---	---	---	---	---	---	---
207	0-33	Peat	PT	A-8	---	---	---	---	---	---
Clunie	33-63	Stratified very fine sand to silty clay loam.	CL	A-6	100	85-100	60-90	50-80	30-40	10-20
208	0-25	Peat	PT	A-8	---	---	---	---	---	---
Doroshin	25-60	Silt loam, gravelly silt loam, loam.	ML, SM	A-4	80-95	70-90	65-90	45-70	---	NP
209	0-20	Silt loam	ML	A-4, A-5	95-100	85-100	65-85	50-70	30-50	NP-10
Cryaquents, tidal	20-60	Variable	---	---	---	---	---	---	---	---
210* Glaciers	0-60		---	---	---	---	---	---	---	---
211	0-7	Peat	PT	A-8	---	---	---	---	---	---
Hewitt	7-12	Silt loam, silty clay loam.	CL	A-6	100	100	95-100	85-100	30-40	10-20
	12-33	Hemic material	PT	A-8	---	---	---	---	---	---
	33-60	Silt loam, silty clay loam.	CL	A-6	95-100	95-100	90-100	80-100	30-40	10-20
212*:										
Histic pergelic cryaquepts	0-11	Peat	PT	A-8	---	---	---	---	---	---
	11-60	---	---	---	---	---	---	---	---	---
Starichkof	0-12	Peat	PT	A-8	---	---	---	---	---	---
	12-60	Stratified hemic material to silt loam.	PT	A-8	---	---	---	---	---	---

See footnote at end of table.

TABLE 9— ENGINEERING INDEX PROPERTIES— Continued

Soil name and map symbol	Depth	USDA texture	Classification		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	4	10	40	200		
	In								Pct	
213---------- Homestead	0-8	Silt loam--------	ML, MH	A-5	100	95-100	90-100	70-85	40-60	NP-10
	8-40	Silt loam, very fine sandy loam.	ML, MH	A-5	100	95-100	90-100	70-85	40-60	NP-10
	40-60	Very gravelly sand, extremely gravelly sand.	GP-GM, GM, SP-SM, SM	A-1	35-60	25-50	10-30	5-15	---	NP
214*:										
Killey----------	0-8	Silt loam--------	ML	A-4	100	100	90-100	70-90	30-35	NP-5
	8-38	Stratified silt loam to fine sand.	SM	A-2, A-4	100	90-100	70-80	30-45	---	NP
	38-63	Very gravelly sand, very gravelly coarse sand.	SP, SP-SM	A-1	60-70	30-50	15-30	0-10	---	NP
Hiline----------	0-3	Silt loam--------	ML	A-4	90-100	90-100	80-100	65-90	30-35	NP-5
	3-41	Stratified silt loam to fine sand.	SM	A-2, A-4	85-100	75-85	60-75	30-40	---	NP
	41-60	Gravelly sand, very cobbly sand.	SP-SM	A-1	60-80	35-70	20-40	5-10	---	NP
215---------- Kliskon	0-2	Silt loam--------	ML	A-4	100	100	90-100	60-80	30-40	NP-10
	2-19	Silt loam, very fine sandy loam.	MH	A-5	100	90-100	80-100	55-70	50-60	NP-10
	19-60	Loam, silt loam, gravelly loam.	GM, SM, ML	A-4	65-95	55-95	50-95	40-85	20-25	NP-5
216*:										
Kroto----------	0-2	Silt loam--------	ML	A-4	100	100	90-100	60-80	30-40	NP-10
	2-19	Silt loam, very fine sandy loam.	ML, MH	A-5	100	90-100	80-100	55-70	40-60	NP-10
	19-60	Loam, silt loam, gravelly silt loam.	GM, SM, ML	A-4	65-95	55-95	50-95	40-85	---	NP
Strandline------	0-5	Silt loam--------	ML	A-4	100	100	90-100	60-80	30-40	NP-10
	5-29	Silt loam, very fine sandy loam.	ML, MH	A-5	100	90-100	80-100	55-70	40-60	NP-10
	29-60	Loam, silt loam, gravelly silt loam.	GM, SM, ML	A-4	65-95	55-95	50-95	40-85	---	NP-5
Cryorthents-----	0-1	Silt loam--------	---	---	95-100	90-100	65-90	50-70	---	---
	1-60	Gravelly silt loam, gravelly loam.	---	---	---	---	---	---	---	---
217---------- Lucile	0-1	Silt loam--------	ML	A-4	100	100	95-100	60-80	30-40	NP-10
	1-26	Silt loam, very fine sandy loam.	ML	A-5	100	95-100	90-100	55-80	40-50	NP-10
	26-60	Gravelly sand, very gravelly sand.	SP-SM, GP-GM	A-1	50-75	40-65	15-30	5-10	---	NP

See footnote at end of table.

TABLE 9— ENGINEERING INDEX PROPERTIES— Continued

Soil name and map symbol	Depth	USDA texture	Classification		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	4	10	40	200		
	In								Pct	
218*, 219*, 220*, 221*, 222*, 223*, 224*:										
Nancy	0-3	Silt loam	ML	A-4	100	100	90-100	75-85	30-40	NP-10
	3-24	Silt loam, very fine sandy loam.	ML	A-5	100	90-95	80-95	65-80	40-50	NP-10
	24-60	Sand and gravel	SP-SM, GP-GM	A-1	50-65	35-50	20-35	5-10	---	NP
Kashwitna	0-2	Silt loam	ML	A-4	100	100	90-100	75-85	30-40	NP-10
	2-18	Silt loam, very fine sandy loam.	ML	A-5	100	90-95	80-95	65-80	40-50	NP-10
	18-60	Very gravelly sand.	SP-SM, GP-GM	A-1	40-65	35-50	20-35	5-10	---	NP
225	0-4	Silt loam	ML	A-4	100	95-100	85-100	65-80	---	NP
Niklason	4-25	Stratified silt loam to sand.	SM	A-4	90-100	90-100	70-85	35-50	---	NP
	25-60	Very gravelly sand, extremely gravelly sand.	GP, SP	A-1	50-65	25-50	10-25	0-5	---	NP
226, 227, 228	0-6	Silt loam	ML	A-4	100	100	95-100	65-90	30-40	NP-10
Puntilla	6-30	Silt loam, loam, very fine sandy loam.	ML	A-5	100	90-100	85-100	60-80	40-50	NP-10
	30-60	Silt loam, loam, gravelly silt loam.	GM, SM, ML	A-4	65-95	55-95	50-95	40-85	20-25	NP-5
229*	0-6		GP, GP-GM, GW, GW-GM	A-1	50-80	50-75	15-45	0-10	---	NP
Riverwash	6-60	Stratified gravelly sand to extremely gravelly coarse sand.	GP, SP, GW, SW	A-1	25-55	25-50	10-30	0-5	---	NP
230*	0-60		GP	A-1	0-10	0-5	0-5	0	---	NP
Rubble land										
231	0-10	Peat	PT	A-8	---	---	---	---	---	---
Salamatof	10-60	Fibric material, peat.	PT	A-8	---	---	---	---	---	---
232	0-2	Silt loam	ML, MH	A-5	90-100	90-100	80-100	65-90	40-60	NP-5
Schrock	2-43	Stratified silt loam to fine sand.	SM	A-2, A-4	85-100	75-85	60-75	30-40	---	NP
	43-60	Stratified very gravelly sand to silt loam.	GM, SM	A-1, A-2	50-70	40-65	30-60	20-30	---	NP
233	13-0	Sapric material	PT	A-8	---	---	---	---	---	---
Slikok	0-6	Mucky silt loam	OL, OH, PT	A-5, A-8	100	100	85-95	80-90	40-60	NP-10
	6-41	Mucky silt loam, silt loam.	OL, ML, OH, MH	A-5	90-100	85-95	75-90	70-80	40-60	NP-10
	41-60	Gravelly silt loam, gravelly fine sandy loam.	GM, SM	A-2, A-4	70-75	55-65	50-60	30-50	---	NP

See footnote at end of table.

TABLE 9— ENGINEERING INDEX PROPERTIES— Continued

Soil name and map symbol	Depth	USDA texture	Classification		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	4	10	40	200		
	In								Pct	
234*:										
Slikok----------	13-0	Sapric material	PT	A-8	---	---	---	---	---	---
	0-6	Mucky silt loam	OL, OH, PT	A-5, A-8	100	100	85-95	80-90	40-60	NP-10
	6-41	Mucky silt loam, silt loam.	OL, ML, OH, MH	A-5	90-100	85-95	75-90	70-80	40-60	NP-10
	41-60	Gravelly silt loam, gravelly fine sandy loam.	GM, SM	A-2, A-4	70-75	55-65	50-60	30-50	---	NP
Starichkof------	0-12	Peat----------	PT	A-8	---	---	---	---	---	---
	12-60	Stratified hemic material to silt loam.	PT	A-8	---	---	---	---	---	---
Strandline------	0-5	Silt loam--------	ML	A-4	100	100	90-100	60-80	30-40	NP-10
	5-31	Silt loam, very fine sandy loam.	ML, MH	A-5	100	90-100	80-100	55-70	40-60	NP-10
	31-60	Loam, silt loam, gravelly silt loam.	GM, SM, ML	A-4	65-95	55-95	50-95	40-85	---	NP-5
235----------	0-2	Silt loam--------	ML	A-5	100	100	90-100	70-90	40-50	NP-10
Spenard	2-25	Silt loam, very fine sandy loam.	ML	A-5	100	100	90-100	70-90	40-50	NP-10
	25-60	Silt loam, gravelly loam, silty clay loam.	CL-ML, CL	A-4, A-6	80-95	65-95	60-95	50-90	25-40	5-20
236----------	0-12	Peat----------	PT	A-8	---	---	---	---	---	---
Starichkof	12-63	Stratified hemic material to silt loam.	PT	A-8	---	---	---	---	---	---
237*:										
Strandline------	0-5	Silt loam--------	ML	A-4	100	100	90-100	60-80	30-40	NP-10
	5-31	Silt loam, very fine sandy loam.	ML, MH	A-5	100	90-100	80-100	55-70	40-60	NP-10
	31-60	Loam, silt loam, gravelly silt loam.	GM, SM, ML	A-4	65-95	55-95	50-95	40-85	---	NP-5
Kroto-----------	0-2	Silt loam--------	ML	A-4	100	100	90-100	60-80	30-40	NP-10
	2-19	Silt loam, very fine sandy loam.	ML, MH	A-5	100	90-100	80-100	55-70	40-60	NP-10
	19-60	Loam, silt loam, gravelly silt loam.	GM, SM, ML	A-4	65-95	55-95	50-95	40-85	---	NP
238*:										
Strandline------	0-5	Silt loam--------	ML	A-4	100	100	90-100	60-80	30-40	NP-10
	5-31	Silt loam, very fine sandy loam.	ML, MH	A-5	100	90-100	80-100	55-70	40-60	NP-10
	31-60	Loam, silt loam, gravelly silt loam.	GM, SM, ML	A-4	65-95	55-95	50-95	40-85	---	NP-5
Kroto-----------	0-2	Silt loam--------	ML	A-4	100	100	90-100	60-80	30-40	NP-10
	2-19	Silt loam, very fine sandy loam.	ML, MH	A-5	100	90-100	80-100	55-70	40-60	NP-10
	19-60	Loam, silt loam, gravelly silt loam.	GM, SM, ML	A-4	65-95	55-95	50-95	40-85	---	NP

See footnote at end of table.

TABLE 9— ENGINEERING INDEX PROPERTIES— Continued

Soil name and map symbol	Depth	USDA texture	Classification		Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	4	10	40	200		
	In								Pct	
238*:										
Chichantna------	0-6	Peat-------------	PT	A-8	---	---	---	---	---	---
	6-28	Stratified hemic material to silt loam.	PT	A-8	---	---	---	---	---	---
	28-35	Silt loam, loam, fine sandy loam.	ML	A-4	100	100	95-100	65-75	30-40	NP-10
	35-64	Sapric material	PT	A-8	---	---	---	---	---	---
239*:										
Strandline------	0-5	Silt loam--------	ML	A-4	100	100	90-100	60-80	30-40	NP-10
	5-31	Silt loam, very fine sandy loam.	ML, MH	A-5	100	90-100	80-100	55-70	40-60	NP-10
	31-60	Loam, silt loam, gravelly silt loam.	GM, SM, ML	A-4	65-95	55-95	50-95	40-85	---	NP-5
Kroto-----------	0-2	Silt loam--------	ML	A-4	100	100	90-100	60-80	30-40	NP-10
	2-19	Silt loam, very fine sandy loam.	ML, MH	A-5	100	90-100	80-100	55-70	40-60	NP-10
	19-60	Loam, silt loam, gravelly silt loam.	GM, SM, ML	A-4	65-95	55-95	50-95	40-85	---	NP
Slikok----------	13-0	Sapric material	PT	A-8	---	---	---	---	---	---
	0-6	Mucky silt loam	OL, OH, PT	A-5, A-8	100	100	85-95	80-90	40-60	NP-10
	6-41	Mucky silt loam, silt loam.	OL, ML, OH, MH	A-5	90-100	85-95	75-90	70-80	40-60	NP-10
	41-60	Gravelly silt loam, gravelly fine sandy loam.	GM, SM	A-2, A-4	70-75	55-65	50-60	30-50	---	NP
240*:										
Strandline------	0-5	Silt loam--------	ML	A-4	100	100	90-100	60-80	30-40	NP-10
	5-31	Silt loam, very fine sandy loam.	ML, MH	A-5	100	90-100	80-100	55-70	40-60	NP-10
	31-60	Loam, silt loam, gravelly silt loam.	GM, SM, ML	A-4	65-95	55-95	50-95	40-85	---	NP-5
Spenard---------	0-2	Silt loam--------	ML	A-5	100	100	90-100	70-90	40-50	NP-10
	2-17	Silt loam, very fine sandy loam.	ML	A-5	100	100	90-100	70-90	40-50	NP-10
	17-60	Silt loam, gravelly loam, silty clay loam.	CL-ML, CL	A-4, A-6	80-95	65-95	60-95	50-90	25-40	5-20
Kroto-----------	0-2	Silt loam--------	ML	A-4	100	100	90-100	60-80	30-40	NP-10
	2-19	Silt loam, very fine sandy loam.	ML, MH	A-5	100	90-100	80-100	55-70	40-60	NP-10
	19-60	Loam, silt loam, gravelly silt loam.	GM, SM, ML	A-4	65-95	55-95	50-95	40-85	---	NP
241--------------	0-1	Silt loam--------	ML	A-4	100	100	90-100	60-80	30-40	NP-5
Suntrana	1-5	Silt loam, very fine sandy loam.	ML, MH	A-5	100	90-100	80-100	55-70	40-60	NP-5
	5-20	Silt loam, very fine sandy loam.	ML, MH	A-5	100	90-100	80-100	55-70	40-60	NP-5
	20-60	Silty clay loam	CL	A-6, A-7	90-100	90-100	85-100	75-90	30-45	15-30

See footnote at end of table.

TABLE 9— ENGINEERING INDEX PROPERTIES— Continued

Soil name and map symbol	Depth	USDA texture	Classification		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	4	10	40	200		
	In								Pct	
242*, 243*:										
Susitna	0-4	Silt loam	ML	A-4	100	100	90-100	75-85	---	NP
	4-48	Stratified silt loam to fine sand.	SM	A-4, A-2	100	90-100	70-80	30-45	---	NP
	48-60	Very gravelly sand.	GP, SP	A-1	40-55	30-50	15-25	0-5	---	NP
Niklason	0-4	Silt loam	ML	A-4	100	95-100	85-100	65-80	---	NP
	4-25	Stratified silt loam to sand.	SM	A-4	90-100	90-100	70-85	35-50	---	NP
	25-60	Very gravelly sand, extremely gravelly sand.	GP, SP	A-1	50-65	25-50	10-25	0-5	---	NP
244	0-10	Peat	PT	A-8	---	---	---	---	---	---
Tyonek	10-60	Stratified sapric material to silt loam.	PT	A-8	---	---	---	---	---	---
245	0-26	Silt loam	ML	A-4	90-100	85-100	80-100	65-85	25-30	NP-5
Wasilla	26-60	Stratified silty clay loam to fine sandy loam.	CL-ML, CL	A-4, A-6	90-100	85-100	80-100	55-70	25-40	5-20

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10— PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" apply only to the surface layer. Absence of an entry indicates that data was not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group
								K	T	
	In	Pct	G/cc	In/hr	In/in	pH				
201*----------	0-6	0-1	---	>6.0	0.01-0.03	---	Low----------	0.05	5	8
Beaches	6-60	0-1	---	>6.0	0.01-0.03	---	Low----------	0.02		
202----------	0-19	0-10	0.60-0.70	0.6-2.0	0.25-0.27	4.5-6.0	Low----------	0.37	1	1
Chedatna	19-60	0-5	1.50-1.60	6.0-20	0.04-0.06	4.5-6.0	Low----------	0.05		
203----------	0-6	0-3	0.05-0.10	6.0-20	0.30-0.32	5.1-6.5	Low----------	0.05	5	8
Chichantna	6-28	0-3	0.05-0.10	6.0-20	0.30-0.32	5.1-6.5	Low----------	0.05		
	28-35	0-10	1.00-1.10	0.6-2.0	0.23-0.25	5.1-6.5	Low----------	0.43		
	35-64	0-3	0.20-0.30	6.0-20	0.30-0.32	5.1-6.5	Low----------	0.05		
204*:										
Chuit----------	0-9	0-10	0.60-0.70	0.6-2.0	0.25-0.27	4.5-5.5	Low----------	0.37	3	1
	9-33	0-10	0.60-0.70	0.6-2.0	0.25-0.27	4.5-5.5	Low----------	0.43		
	33-60	5-15	1.60-1.70	0.2-0.6	0.23-0.25	4.5-5.5	Low----------	0.32		
Nakochna--------	0-3	0-10	0.60-0.70	0.6-2.0	0.25-0.27	4.5-5.5	Low----------	0.37	1	1
	3-17	0-10	0.60-0.70	0.6-2.0	0.23-0.25	4.5-5.5	Low----------	0.28		
	17	---	---	---	---	---	----------	----		
Chichantna------	0-6	0-3	0.05-0.10	6.0-20	0.30-0.32	5.1-6.5	Low----------	0.05	5	8
	6-28	0-3	0.05-0.10	6.0-20	0.30-0.32	5.1-6.5	Low----------	0.05		
	28-35	0-10	1.00-1.10	0.6-2.0	0.23-0.25	5.1-6.5	Low----------	0.43		
	35-64	0-3	0.20-0.30	6.0-20	0.30-0.32	5.1-6.5	Low----------	0.05		
205*:										
Chuit----------	0-9	0-10	0.60-0.70	0.6-2.0	0.25-0.27	4.5-5.5	Low----------	0.37	3	1
	9-33	0-10	0.60-0.70	0.6-2.0	0.25-0.27	4.5-5.5	Low----------	0.43		
	33-60	5-15	1.60-1.70	0.2-0.6	0.23-0.25	4.5-5.5	Low----------	0.32		
Nakochna--------	0-3	0-10	0.60-0.70	0.6-2.0	0.25-0.27	4.5-5.5	Low----------	0.37	1	1
	3-17	0-10	0.60-0.70	0.6-2.0	0.23-0.25	4.5-5.5	Low----------	0.28		
	17	---	---	---	---	---	----------	----		
Rubble land-----	0-60	0	1.70-2.35	>20	0.0-0.1	---	Low----------	----	---	8
206*:										
Chuit----------	0-9	0-10	0.60-0.70	0.6-2.0	0.25-0.27	4.5-5.5	Low----------	0.37	3	1
	9-33	0-10	0.60-0.70	0.6-2.0	0.25-0.27	4.5-5.5	Low----------	0.43		
	33-60	5-15	1.60-1.70	0.2-0.6	0.23-0.25	4.5-5.5	Low----------	0.32		
Nakochna--------	0-3	0-10	0.60-0.70	0.6-2.0	0.25-0.27	4.5-5.5	Low----------	0.37	1	1
	3-17	0-10	0.60-0.70	0.6-2.0	0.23-0.25	4.5-5.5	Low----------	0.28		
	17	---	---	---	---	---	----------	----		
207----------	0-33	0-3	0.05-0.10	6.0-20	0.19-0.21	5.1-7.3	Low----------	0.05	2	8
Clunie	33-63	20-30	1.50-1.60	0.00-0.06	0.19-0.21	5.6-7.3	Moderate-----	0.24		
208----------	0-25	0-3	0.07-0.12	6.0-20	0.24-0.27	4.5-5.5	Low----------	0.05	2	8
Doroshin	25-60	0-10	1.30-1.40	0.6-2.0	0.18-0.22	4.5-5.5	Low----------	0.32		
209----------	0-20	0-10	0.90-1.30	0.6-2.0	0.22-0.24	6.1-7.3	Low----------	0.37	5	2
Cryaquents,tidal	20-60	---	0.90-1.60	0.6-2.0	0.05-0.30	6.6-7.3	Low----------	----		
210*----------	0-60	---	---	---	---	---	----------	----	---	---
Glaciers										

See footnote at end of table.

TABLE 10— PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS— Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group
								K	T	
	In	Pct	G/cc	In/hr	In/in	pH				
211----------	0-7	0-3	0.05-0.10	6.0-20	0.30-0.33	5.1-6.5	Low----------	0.05	1	8
Hewitt	7-12	20-30	1.60-1.70	0.06-0.2	0.25-0.27	5.6-7.3	Moderate-----	0.28		
	12-33	0-5	0.05-0.10	6.0-20	0.30-0.33	5.6-7.3	Low----------	0.05		
	33-60	20-30	1.60-1.70	0.06-0.2	0.25-0.27	5.6-7.3	Moderate-----	0.28		
212*:										
Histic pergelic cryaquepts-----	0-11	---	0.05-0.10	2.0-6.0	0.32-0.35	5.6-6.5	Low----------	0.05	1	1
	11-60	---	---	---	---	---	----------	----		
Starichkof------	0-12	---	0.05-0.10	6.0-20	0.32-0.35	3.6-5.0	Low----------	0.05	5	8
	12-60	0-3	0.07-0.20	6.0-20	0.32-0.35	3.6-5.0	Low----------	0.05		
213----------	0-8	0-10	0.80-0.90	0.6-2.0	0.30-0.32	5.1-6.0	Low----------	0.37	1	1
Homestead	8-40	0-10	0.80-0.90	0.6-2.0	0.30-0.32	5.1-6.0	Low----------	0.43		
	40-60	0-2	1.50-1.60	6.0-20	0.02-0.04	5.1-6.0	Low----------	0.05		
214*:										
Killey----------	0-8	5-10	0.80-0.90	0.6-2.0	0.25-0.27	4.5-5.5	Low----------	0.37	2	8
	8-38	0-5	0.90-1.00	0.6-2.0	0.17-0.20	4.5-5.5	Low----------	0.28		
	38-63	0-5	1.50-1.60	6.0-20	0.02-0.04	4.5-5.5	Low----------	0.05		
Hiline----------	0-3	5-10	0.80-0.90	0.6-2.0	0.25-0.27	4.5-5.5	Low----------	0.37	3	8
	3-41	0-5	0.90-1.00	0.6-2.0	0.17-0.20	4.5-5.5	Low----------	0.28		
	41-60	0-5	1.40-1.50	6.0-20	0.04-0.06	4.5-5.5	Low----------	0.05		
215----------	0-2	0-10	0.70-0.80	0.6-2.0	0.25-0.27	4.5-5.5	Low----------	0.37	2	1
Kliskon	2-19	0-10	0.50-0.70	0.6-2.0	0.25-0.27	3.6-5.5	Low----------	0.43		
	19-60	5-15	1.60-1.70	0.2-0.6	0.20-0.23	3.6-5.5	Low----------	0.32		
216*:										
Kroto----------	0-2	0-10	0.70-0.80	0.6-2.0	0.25-0.27	3.6-5.5	Low----------	0.37	2	1
	2-19	0-10	0.50-0.70	0.6-2.0	0.25-0.27	3.6-5.5	Low----------	0.28		
	19-60	5-15	1.60-1.70	0.2-0.6	0.20-0.23	4.5-5.5	Low----------	0.43		
Strandline------	0-5	0-10	0.70-0.80	0.6-2.0	0.25-0.27	3.6-5.5	Low----------	0.37	2	1
	5-29	0-10	0.50-0.70	0.6-2.0	0.25-0.27	3.6-5.5	Low----------	0.43		
	29-60	5-15	1.60-1.70	0.2-0.6	0.20-0.22	4.5-5.5	Low----------	0.32		
Cryorthents-----	0-1	5-20	0.90-1.30	0.6-2.0	0.22-0.24	4.5-5.5	----------	0.37	4	2
	1-60	5-15	---	0.06-20	0.06-0.18	5.1-6.5	Low----------	----		
217----------	0-1	0-10	0.60-0.70	0.6-2.0	0.25-0.27	4.5-5.5	Low----------	0.37	2	1
Lucile	1-26	0-10	0.60-0.70	0.6-2.0	0.25-0.27	4.5-5.5	Low----------	0.43		
	26-60	0-5	1.50-1.60	6.0-20	0.03-0.05	4.5-6.0	Low----------	0.05		
218*, 219*, 220*, 221*, 222*, 223*, 224*:										
Nancy----------	0-3	0-10	0.80-0.90	0.6-2.0	0.25-0.27	3.6-5.5	Low----------	0.37	2	1
	3-24	0-10	0.80-0.90	0.6-2.0	0.25-0.27	4.5-5.5	Low----------	0.43		
	24-60	0-5	1.50-1.60	6.0-20	0.03-0.05	4.5-5.5	Low----------	0.05		
218*, 219*, 220*, 221*, 222*, 223*, 224*:										
Kashwitna------	0-2	0-10	0.80-0.90	0.6-2.0	0.25-0.27	3.6-5.5	Low----------	0.37	1	1
	2-18	0-10	0.80-0.90	0.6-2.0	0.25-0.27	4.5-5.5	Low----------	0.43		
	18-60	0-5	1.50-1.60	6.0-20	0.03-0.05	4.5-5.5	Low----------	0.05		

See footnote at end of table.

TABLE 10— PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS— Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group
								K	T	
	In	Pct	G/cc	In/hr	In/in	pH				
225----------	0-4	0-10	0.80-1.00	0.6-2.0	0.23-0.25	4.5-5.5	Low----------	0.37	1	2
Niklason	4-25	0-5	0.90-1.10	2.0-6.0	0.15-0.18	5.1-6.0	Low----------	0.37		
	25-60	0-5	1.50-1.60	6.0-20	0.02-0.04	5.1-6.0	Low----------	0.05		
226, 227, 228----	0-6	0-10	0.60-0.70	0.6-2.0	0.25-0.27	3.6-5.5	Low----------	0.37	3	1
Puntilla	6-30	0-10	0.60-0.70	0.6-2.0	0.25-0.27	3.6-5.5	Low----------	0.43		
	30-60	5-15	1.60-1.70	0.2-0.6	0.20-0.23	4.5-5.5	Low----------	0.32		
229*----------	0-6	0-1	---	>6.0	0.03-0.04	---	Low----------	----	---	8
Riverwash	6-60	0-1	---	>6.0	0.02-0.03	---	Low----------	----		
230*----------	0-60	0	1.70-2.35	>20	0.0-0.1	---	Low----------	----	---	8
Rubble land										
231----------	0-10	0-3	0.05-0.10	6.0-20	0.25-0.30	<4.5	Low----------	0.05	5	8
Salamatof	10-60	0-3	0.05-0.10	6.0-20	0.25-0.30	<4.5	Low----------	0.05		
232----------	0-2	5-10	0.70-0.80	0.6-2.0	0.25-0.27	3.6-5.0	Low----------	0.37	3	1
Schrock	2-43	0-5	0.90-1.10	0.6-2.0	0.17-0.20	5.1-6.0	Low----------	0.28		
	43-60	0-5	1.30-1.40	6.0-20	0.05-0.07	5.1-6.0	Low----------	0.10		
233----------	13-0	0-3	0.05-0.10	6.0-20	0.30-0.32	4.5-5.5	Low----------	0.05	4	8
Slikok	0-6	5-10	0.50-0.60	0.6-2.0	0.28-0.30	5.1-5.5	Low----------	0.37		
	6-41	5-10	0.50-0.60	0.6-2.0	0.28-0.30	5.1-5.5	Low----------	0.37		
	41-60	0-10	1.60-1.70	0.06-0.2	0.25-0.27	5.1-5.5	Low----------	0.28		
234*:										
Slikok----------	13-0	0-3	0.05-0.10	6.0-20	0.30-0.32	4.5-5.5	Low----------	0.05	4	8
	0-6	5-10	0.50-0.60	0.6-2.0	0.28-0.30	5.1-5.5	Low----------	0.37		
	6-41	5-10	0.50-0.60	0.6-2.0	0.28-0.30	5.1-5.5	Low----------	0.37		
	41-60	0-10	1.60-1.70	0.06-0.2	0.25-0.27	5.1-5.5	Low----------	0.28		
Starichkof------	0-12	---	0.05-0.10	6.0-20	0.32-0.35	3.6-5.0	Low----------	0.05	5	8
	12-60	0-3	0.07-0.20	6.0-20	0.32-0.35	3.6-5.0	Low----------	0.05		
Strandline------	0-5	0-10	0.70-0.80	0.6-2.0	0.25-0.27	3.6-5.5	Low----------	0.37	2	1
	5-31	0-10	0.50-0.70	0.6-2.0	0.25-0.27	3.6-5.5	Low----------	0.43		
	31-60	5-15	1.60-1.70	0.2-0.6	0.20-0.22	4.5-5.5	Low----------	0.32		
235----------	0-2	0-10	0.60-0.70	0.6-2.0	0.30-0.33	4.5-5.0	Low----------	0.37	3	8
Spenard	2-25	0-10	0.60-0.70	0.6-2.0	0.30-0.33	4.5-5.0	Low----------	0.43		
	25-60	15-30	1.60-1.70	0.2-0.6	0.25-0.27	4.5-5.5	Moderate-----	0.37		
236----------	0-12	---	0.05-0.10	6.0-20	0.32-0.35	3.6-5.0	Low----------	0.05	5	8
Starichkof	12-63	0-3	0.07-0.20	6.0-20	0.32-0.35	3.6-5.0	Low----------	0.05		
237*:										
Strandline------	0-5	0-10	0.70-0.80	0.6-2.0	0.25-0.27	3.6-5.5	Low----------	0.37	2	1
	5-31	0-10	0.50-0.70	0.6-2.0	0.25-0.27	3.6-5.5	Low----------	0.43		
	31-60	5-15	1.60-1.70	0.2-0.6	0.20-0.22	4.5-5.5	Low----------	0.32		
Kroto----------	0-2	0-10	0.70-0.80	0.6-2.0	0.25-0.27	3.6-5.5	Low----------	0.37	2	1
	2-19	0-10	0.50-0.70	0.6-2.0	0.25-0.27	3.6-5.5	Low----------	0.28		
	19-60	5-15	1.60-1.70	0.2-0.6	0.20-0.23	4.5-5.5	Low----------	0.43		
238*:										
Strandline------	0-5	0-10	0.70-0.80	0.6-2.0	0.25-0.27	3.6-5.5	Low----------	0.37	2	1
	5-31	0-10	0.50-0.70	0.6-2.0	0.25-0.27	3.6-5.5	Low----------	0.43		
	31-60	5-15	1.60-1.70	0.2-0.6	0.20-0.22	4.5-5.5	Low----------	0.32		

See footnote at end of table.

TABLE 10— PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS— Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group
								K	T	
	In	Pct	G/cc	In/hr	In/in	pH				
238*:										
Kroto----------	0-2	0-10	0.70-0.80	0.6-2.0	0.25-0.27	3.6-5.5	Low----------	0.37	2	1
	2-19	0-10	0.50-0.70	0.6-2.0	0.25-0.27	3.6-5.5	Low----------	0.28		
	19-60	5-15	1.60-1.70	0.2-0.6	0.20-0.23	4.5-5.5	Low----------	0.43		
Chichantna------	0-6	0-3	0.05-0.10	6.0-20	0.30-0.32	5.1-6.5	Low----------	0.05	5	8
	6-28	0-3	0.05-0.10	6.0-20	0.30-0.32	5.1-6.5	Low----------	0.05		
	28-35	0-10	1.00-1.10	0.6-2.0	0.23-0.25	5.1-6.5	Low----------	0.43		
	35-64	0-3	0.20-0.30	6.0-20	0.30-0.32	5.1-6.5	Low----------	0.05		
239*:										
Strandline------	0-5	0-10	0.70-0.80	0.6-2.0	0.25-0.27	3.6-5.5	Low----------	0.37	2	1
	5-31	0-10	0.50-0.70	0.6-2.0	0.25-0.27	3.6-5.5	Low----------	0.43		
	31-60	5-15	1.60-1.70	0.2-0.6	0.20-0.22	4.5-5.5	Low----------	0.32		
Kroto----------	0-2	0-10	0.70-0.80	0.6-2.0	0.25-0.27	3.6-5.5	Low----------	0.37	2	1
	2-19	0-10	0.50-0.70	0.6-2.0	0.25-0.27	3.6-5.5	Low----------	0.28		
	19-60	5-15	1.60-1.70	0.2-0.6	0.20-0.23	4.5-5.5	Low----------	0.43		
Slikok----------	13-0	0-3	0.05-0.10	6.0-20	0.30-0.32	4.5-5.5	Low----------	0.05	4	8
	0-6	5-10	0.50-0.60	0.6-2.0	0.28-0.30	5.1-5.5	Low----------	0.37		
	6-41	5-10	0.50-0.60	0.6-2.0	0.28-0.30	5.1-5.5	Low----------	0.37		
	41-60	0-10	1.60-1.70	0.06-0.2	0.25-0.27	5.1-5.5	Low----------	0.28		
240*:										
Strandline------	0-5	0-10	0.70-0.80	0.6-2.0	0.25-0.27	3.6-5.5	Low----------	0.37	2	1
	5-31	0-10	0.50-0.70	0.6-2.0	0.25-0.27	3.6-5.5	Low----------	0.43		
	31-60	5-15	1.60-1.70	0.2-0.6	0.20-0.22	4.5-5.5	Low----------	0.32		
Spenard---------	0-2	0-10	0.60-0.70	0.6-2.0	0.30-0.33	4.5-5.0	Low----------	0.37	3	8
	2-17	0-10	0.60-0.70	0.6-2.0	0.30-0.33	4.5-5.0	Low----------	0.43		
	17-60	15-30	1.60-1.70	0.2-0.6	0.25-0.27	4.5-5.5	Moderate-----	0.37		
Kroto----------	0-2	0-10	0.70-0.80	0.6-2.0	0.25-0.27	3.6-5.5	Low----------	0.37	2	1
	2-19	0-10	0.50-0.70	0.6-2.0	0.25-0.27	3.6-5.5	Low----------	0.28		
	19-60	5-15	1.60-1.70	0.2-0.6	0.20-0.23	4.5-5.5	Low----------	0.43		
241---------------	0-1	0-10	0.70-0.80	0.6-2.0	0.25-0.27	3.6-5.5	Low----------	0.37	1	1
Suntrana	1-5	0-10	0.50-0.70	0.6-2.0	0.25-0.27	4.5-5.5	Low----------	0.43		
	5-20	0-10	0.50-0.70	0.6-2.0	0.25-0.27	4.5-6.0	Low----------	0.43		
	20-60	27-35	1.60-1.70	<0.06	0.23-0.25	4.5-6.0	High----------	0.43		
242*, 243*:										
Susitna---------	0-4	0-10	0.80-0.90	0.6-2.0	0.25-0.27	4.5-5.5	Low----------	0.37	3	2
	4-48	0-10	0.90-1.00	0.6-2.0	0.15-0.17	5.1-6.0	Low----------	0.37		
	48-60	0-5	1.50-1.60	6.0-20	0.02-0.04	5.1-6.0	Low----------	0.05		
Niklason--------	0-4	0-10	0.80-1.00	0.6-2.0	0.23-0.25	4.5-5.5	Low----------	0.37	1	2
	4-25	0-5	0.90-1.10	2.0-6.0	0.15-0.18	5.1-6.0	Low----------	0.37		
	25-60	0-5	1.50-1.60	6.0-20	0.02-0.04	5.1-6.0	Low----------	0.05		
244---------------	0-10	---	0.05-0.10	6.0-20	0.30-0.32	3.6-5.5	Low----------	0.05	5	8
Tyonek	10-60	0-3	0.20-0.30	0.6-2.0	0.30-0.32	4.5-6.0	Low----------	0.05		
245---------------	0-26	5-10	0.80-0.90	0.6-2.0	0.22-0.24	4.5-5.5	Low----------	0.37	5	1
Wasilla	26-60	20-35	1.20-1.30	0.2-0.6	0.22-0.24	4.5-5.5	Moderate-----	0.28		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11— WATER FEATURES

("Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data was not estimated)

Soil name and map symbol	Hydrologic group	Flooding			High Water Table		
		Frequency	Duration	Months	Depth	Kind	Months
					Ft		
201*-- Beaches	D	Frequent	Very brief to long.	Jan-Dec	0-6.0	Apparent	Jan-Dec
202-- Chedatna	B	Rare	---	---	4.0-6.0	Apparent	Apr-Oct
203-- Chichantna	D	None	---	---	0-0.5	Apparent	Jan-Dec
204*:							
Chuit	B	None	---	---	>6.0	---	---
Nakochna	D	None	---	---	>6.0	---	---
Chichantna	D	None	---	---	0-0.5	Apparent	Jan-Dec
205*:							
Chuit	B	None	---	---	>6.0	---	---
Nakochna	D	None	---	---	>6.0	---	---
Rubble land	A	None	---	---	>6.0	---	---
206*:							
Chuit	B	None	---	---	>6.0	---	---
Nakochna	D	None	---	---	>6.0	---	---
207-- Clunie	D	Frequent	Brief	Jan-Dec	+1-1.0	Apparent	Jan-Dec
208-- Doroshin	D	None	---	---	0-1.0	Apparent	Jan-Dec
209-- Cryaquents,tidal	D	Frequent	Brief	Jan-Dec	0-0.5	Apparent	Jan-Dec
210*-- Glaciers	-	None	---	---	>6.0	---	---
211-- Hewitt	D	Occasional	Brief	May-Aug	0-0.5	Perched	Jan-Dec
212*:							
Histic pergelic cryaquepts	D	None	---	---	0-1.5	Perched	Jan-Dec
Starichkof	D	None	---	---	+1-0.5	Apparent	Jan-Dec
213-- Homestead	A	None	---	---	>6.0	---	---
214*:							
Killey	D	Frequent	Brief	Apr-Aug	0-1.5	Apparent	Jan-Dec
Hiline	D	Frequent	Brief	Apr-Aug	0-1.5	Apparent	Jan-Dec

See footnote at end of table.

TABLE 11— WATER FEATURES— Continued

Soil name and map symbol	Hydrologic group	Flooding			High Water Table		
		Frequency	Duration	Months	Depth	Kind	Months
					Ft		
215---------- Kliskon	C	None----------	---	---	1.5-2.5	Apparent	Apr-Oct
216*:							
Kroto----------	B	None----------	---	---	>6.0	---	---
Strandline----------	B	None----------	---	---	>6.0	---	---
Cryorthents----------	B	None----------	---	---	>6.0	---	---
217---------- Lucile	C	None----------	---	---	1.5-2.5	Apparent	Apr-Oct
218*, 219*, 220*, 221*, 222*, 223*, 224*:							
Nancy----------	B	None----------	---	---	>6.0	---	---
Kashwitna----------	B	None----------	---	---	>6.0	---	---
225---------- Niklason	B	Frequent--------	Brief---------	Apr-Aug	>6.0	---	---
226, 227, 228---------- Puntilla	B	None----------	---	---	>6.0	---	---
229*---------- Riverwash	D	Frequent--------	Long to very long.	Oct-Jul	0-2.0	Apparent	Jan-Dec
230*---------- Rubble land	A	None----------	---	---	>6.0	---	---
231---------- Salamatof	D	None----------	---	---	+1-0.5	Apparent	Jan-Dec
232---------- Schrock	B	Rare----------	---	---	>6.0	---	---
233---------- Slikok	D	None----------	---	---	+1-1.0	Apparent	Jan-Dec
234*:							
Slikok----------	D	None----------	---	---	+1-1.0	Apparent	Jan-Dec
Starichkof----------	D	None----------	---	---	+1-0.5	Apparent	Jan-Dec
Strandline----------	B	None----------	---	---	>6.0	---	---
235---------- Spenard	D	None----------	---	---	0-2.0	Apparent	Jan-Dec
236---------- Starichkof	D	None----------	---	---	+1-0.5	Apparent	Jan-Dec
237*:							
Strandline----------	B	None----------	---	---	>6.0	---	---
Kroto----------	B	None----------	---	---	>6.0	---	---
238*:							
Strandline----------	B	None----------	---	---	>6.0	---	---

See footnote at end of table.

TABLE 11— WATER FEATURES— Continued

Soil name and map symbol	Hydrologic group	Flooding			High Water Table		
		Frequency	Duration	Months	Depth	Kind	Months
					Ft		
238*:							
Kroto	B	None	---	---	>6.0	---	---
Chichantna	D	None	---	---	0-0.5	Apparent	Jan-Dec
239*:							
Strandline	B	None	---	---	>6.0	---	---
Kroto	B	None	---	---	>6.0	---	---
Slikok	D	None	---	---	+1-1.0	Apparent	Jan-Dec
240*:							
Strandline	B	None	---	---	>6.0	---	---
Spenard	D	None	---	---	0-2.0	Apparent	Jan-Dec
Kroto	B	None	---	---	>6.0	---	---
241—Suntrana	D	None	---	---	1.0-2.0	Perched	Jan-Dec
242*:							
Susitna	B	Occasional	Brief	Apr-Sep	>6.0	---	---
Niklason	B	Occasional	Brief	Apr-Aug	>6.0	---	---
243*:							
Susitna	B	Frequent	Brief	Apr-Sep	>6.0	---	---
Niklason	B	Frequent	Brief	Apr-Aug	>6.0	---	---
244—Tyonek	D	None	---	---	0-0.5	Apparent	Jan-Dec
245—Wasilla	D	Frequent	Long	Jun-Sep	1.0-3.0	Apparent	Jan-Dec

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12— SOIL FEATURES

(The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data was not estimated)

Soil name and map symbol	Bedrock		Subsidence		Potential frost action	Risk of corrosion	
	Depth	Hardness	Initial	Total		Uncoated steel	Concrete
	In		In	In			
201*-- Beaches	>60	---	---	---	---	---	---
202-- Chedatna	>60	---	---	---	Moderate	High	High.
203-- Chichantna	>60	---	5-10	15-20	High	Moderate	Moderate.
204*:							
Chuit	>60	---	---	---	High	High	High.
Nakochna	14-20	Hard	---	---	High	High	High.
Chichantna	>60	---	5-10	15-20	High	Moderate	Moderate.
205*:							
Chuit	>60	---	---	---	High	High	High.
Nakochna	14-20	Hard	---	---	High	High	High.
Rubble land	>40	Hard	---	---	---	---	---
206*:							
Chuit	>60	---	---	---	High	High	High.
Nakochna	14-20	Hard	---	---	High	High	High.
207-- Clunie	>60	---	12-20	24-40	High	High	High.
208-- Doroshin	>60	---	12-25	24-36	High	High	High.
209-- Cryaquents,tidal	>60	---	---	---	High	Moderate	Moderate.
210*-- Glaciers	>60	---	---	---	---	---	---
211-- Hewitt	>60	---	3-5	10-15	High	Moderate	Moderate.
212*:							
Histic pergelic cryaquepts	>60	---	---	---	High	Moderate	Moderate.
Starichkof	>60	---	8-12	20-26	High	High	High.
213-- Homestead	>60	---	---	---	Low	High	High.
214*:							
Killey	>60	---	---	---	High	High	High.
Hiline	>60	---	---	---	High	High	High.

See footnote at end of table.

TABLE 12— SOIL FEATURES— Continued

Soil name and map symbol	Bedrock		Subsidence		Potential frost action	Risk of corrosion	
	Depth	Hardness	Initial	Total		Uncoated steel	Concrete
	In		In	In			
215—Kliskon	>60	---	---	---	High	High	High.
216*:							
Kroto	>60	---	---	---	High	High	High.
Strandline	>60	---	---	---	High	High	High.
Cryorthents	>60	---	---	---	Moderate	High	Moderate.
217—Lucile	>60	---	---	---	High	High	High.
218*, 219*, 220*, 221*, 222*, 223*, 224*:							
Nancy	>60	---	---	---	High	High	High.
Kashwitna	>60	---	---	---	High	High	High.
225—Niklason	>60	---	---	---	Moderate	High	High.
226, 227, 228—Puntilla	>60	---	---	---	High	High	High.
229*—Riverwash	>60	---	---	---	---	---	---
230*—Rubble land	>40	Hard	---	---	---	---	---
231—Salamatof	>60	---	15-30	30-60	High	High	High.
232—Schrock	>60	---	---	---	High	High	High.
233—Slikok	>60	---	4-6	10-24	High	High	High.
234*:							
Slikok	>60	---	4-6	10-24	High	High	High.
Starichkof	>60	---	8-12	20-26	High	High	High.
Strandline	>60	---	---	---	High	High	High.
235—Spenard	>60	---	---	---	High	High	High.
236—Starichkof	>60	---	8-12	20-26	High	High	High.
237*:							
Strandline	>60	---	---	---	High	High	High.
Kroto	>60	---	---	---	High	High	High.
238*:							
Strandline	>60	---	---	---	High	High	High.
Kroto	>60	---	---	---	High	High	High.

See footnote at end of table.

TABLE 12— SOIL FEATURES— Continued

Soil name and map symbol	Bedrock		Subsidence		Potential frost action	Risk of corrosion	
	Depth	Hardness	Initial	Total		Uncoated steel	Concrete
	In		*In*	In			
238*:							
Chichantna	>60	---	5-10	15-20	High	Moderate	Moderate.
239*:							
Strandline	>60	---	---	---	High	High	High.
Kroto	>60	---	---	---	High	High	High.
Slikok	>60	---	4-6	10-24	High	High	High.
240*:							
Strandline	>60	---	---	---	High	High	High.
Spenard	>60	---	---	---	High	High	High.
Kroto	>60	---	---	---	High	High	High.
241 Suntrana	>60	---	---	---	High	High	High.
242*:							
Susitna	>60	---	---	---	Moderate	High	High.
Niklason	>60	---	---	---	Moderate	High	High.
243*:							
Susitna	>60	---	---	---	Moderate	High	High.
Niklason	>60	---	---	---	Moderate	High	High.
244 Tyonek	>60	---	5-10	15-40	High	High	High.
245 Wasilla	>60	---	---	---	High	High	High.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13— CLASSIFICATION OF THE SOILS

(An asterisk in the first column indicates that the soil is a taxadjunct to the series. See the text for a description of those characteristics of the soil that are outside the range of the series.)

Soil name	Family or higher taxonomic class
Beaches.	
Chedatna	Medial over sandy or sandy-skeletal, mixed Andic Cryochrepts
Chichantna	Euic Fluvaquentic Borosaprists
Chuit	Medial over loamy, mixed Andic Humicryods
Clunie	Loamy, mixed, euic Terric Borofibrists
Cryaquents,tidal	Cryaquents
Cryorthents	Cryorthents
Doroshin	Loamy, mixed, euic Terric Borohemists
Hewitt	Loamy, mixed, euic Terric Borohemists
Hiline	Coarse-loamy, mixed, acid Typic Cryaquents
Histic pergelic cryaquepts	Histic Pergelic Cryaquepts
*Homestead	Loamy-skeletal, mixed Typic Haplocryods
Kashwitna	Medial over sandy or sandy-skeletal, mixed Andic Haplocryods
Killey	Coarse-loamy over sandy or sandy-skeletal, mixed, acid Typic Cryaquents
Kliskon	Medial over loamy, mixed Andic Cryaquods
Kroto	Medial over loamy, mixed Andic Haplocryods
Lucile	Medial over sandy or sandy-skeletal, mixed Andic Cryaquods
Nakochna	Medial Lithic Humicryods
Nancy	Medial over sandy or sandy-skeletal, mixed Andic Haplocryods
*Niklason	Coarse-loamy over sandy or sandy-skeletal, mixed, nonacid Typic Cryofluvents
Puntilla	Medial over loamy, mixed Andic Humicryods
Salamatof	Dysic Sphagnic Borofibrists
Schrock	Medial over loamy, mixed Entic Haplocryods
Slikok	Coarse-silty, mixed, acid Histic Cryaquepts
Spenard	Medial over loamy, mixed Andic Cryaquods
Starichkof	Dysic Fluvaquentic Borohemists
Strandline	Medial over loamy, mixed Andic Haplocryods
Suntrana	Medial over loamy, mixed Andic Cryaquods
Susitna	Coarse-loamy, mixed, nonacid Typic Cryofluvents
Tyonek	Euic Fluvaquentic Borosaprists
Wasilla	Fine-loamy, mixed, acid Humic Cryaquepts